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**ITBI - 13**



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## **5th International Conference on IT and Business Intelligence (ITBI-13)**

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13-15 December, 2013

### **Venue:**

JUET, Guna, Madhya Pradesh, India

### **Jointly Organized by:**



Institute of Management Technology, Nagpur, India

**&**



Jaypee University of Engineering & Technology, Guna, MP, India

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IMT-Nagpur is a premier business school in India. It is listed among top 20 private B-schools in the country by major ranking agencies like Business standard and CNBC TV18. Established in 2004 by Late ShriMahendraNath, the campus spreads over a sprawling 27 acres at the outskirts of Nagpur. IMT-Nagpur offers Ph.D and residential post-graduation program in various disciplines of management. The institution has been conceptualized as a center for managerial excellence and an institution conforming to global academic standards. To achieve its goals, IMT-Nagpur provides its students with academic, extracurricular and other necessary facilities to groom into 'leaders of the future'. IMT-Nagpur has tie ups with 35 universities around the world for faculty and student exchange. This helps us provide world class education and opportunities and contribute to the growth of students and faculty. With rich education input, our students are well placed in most reputed companies. IMT-Nagpur also organizes full time long duration residential MDP/FDP/Workshops/Seminars for corporate executives and faculty members of other B-Schools, apart from providing consultancy services to the corporate world.

## About JUET, Guna, Madhya Pradesh

Jaypee Institute of Engineering and Technology, Guna was established in the year 2003 based on the MOU signed between JaiprakashSewaSansthan (a not-for-profit trust sponsored by Rs. 18,000 Cr Jaypee Group) and the Government of Madhya Pradesh with an aim of becoming a Center of Excellence in Engineering and Technology. Based on our request to enable the Institute to become a State University, the Government of MP has, vide gazette extra ordinary no. 3 of 2010 dated 29th April 2010 has established Jaypee University of Engineering and Technology (JUET), Raghogarh, Guna as a private university in the State of MP under the provisions of MP NijiVishwavidyalayaAdhiniyam 2007. This is one of the three Universities established for imparting Engineering education by the JaiprakashSewaSansthan (JSS), an educational initiative which recognizes the role of IT and emerging technologies in improving the quality of life of the people of India. JUET's location at Raghogarh, in Guna district, is a well thought out process. This region, currently in a rural setting with strong agricultural activities is likely to grow as a major

industrial hub. JUET is being developed as a major center to provide competent, well trained technical manpower to the region.

The JUET campus on the national highway linking Agra to Mumbai sprawls over 100 acre as a modern institution of higher learning in the field of engineering and technical education. The foundation stone of this institution was laid on 15th March 2002 by the then chief minister of Madhya Pradesh ShriDigvijay Singh. The complex is being built on a well thought out "Seven Phase" plan to make it a self sufficient, vibrant modern center of excellence with the mission of providing an excellent quality of Undergraduate and Postgraduate education, with a strong emphasis on research and innovation and close interaction with the industry. It aims to produce professionals who can be leaders in innovation, entrepreneurship, creativity and management. The first academic activities started in the year 2003. Presently the institute offers 4 year (8 semester) B.Tech Programmes, M.Tech. Programmes and Doctoral Programmes in Chemical Engineering, Civil Engineering, Computer Science and Engineering and Electronics and Communication Engineering and Mechanical Engineering. The Doctoral Programmes are also available in Mathematics and Physics streams. Six Semester Diploma program in Building Materials and Cement Technology and Thermal Power Plant Engineering with strong practical gain is also offered.

The University has the modern campus, well equipped state-of-the-art laboratories and library, which provides a pleasant and intellectually stimulating ambience for students in eco-friendly environment. Special emphasis has been laid on developing an environment highly conducive for

- Building of a solid foundation of knowledge
- Confidence building
- Pursuit of excellence and self discipline
- Personality development

Inculcation of creativity through motivation and drive, which helps to produce innovative professionals well equipped for the rigors of emerging challenges of professional and social life.

The University aims to offer the complete educational spectrum of programs in emerging technologies at the degree levels. Research in emerging areas of technology is a major trust and is leveraged for all academic pursuits.

## Message from Editorial Desk

I am elated to pronounce the annual observance of “5<sup>th</sup> International Conference on Information Technology and Business intelligence”. I muster my courage to adumbrate the theme in the context as a pre-knowledge before my learned audience and convey my conscious gratitude and cordial humility to the contributing authors in the field.

Business, in its ancient avatar, has been facilitating life from the dawning shades of its existence. Its compass have been made even broader to meet the fresh verves of a new epoch. As a business necessity stands today, embracing every quantum of business perspective and professional growth-factor, technology becomes older with each click of a second. Hence the international texture of trading needs to be interspersed with sporadic illumination of ingenious ideas and technological progress that augment business interaction, propagate market exposure and multiply revenues. For a worthwhile dissemination of business learning, Information Technology and business intelligence should tread with their shoulders attached. As posed before a dextrous world as complementary to each other, these two modern streams of academics can achieve a new paradigm.

It gives me measureless delight to find the radical compatibility between the conference theme and IJIRD mission. IJIRD Encourages innovative & quality research work. This multidisciplinary journal is deliberated on diverse elemental branches of the contemporary research school, namely Science, Management, Technology and Humanities with an equal concentration in each area as we believe in the dissemination of knowledge through a perfect amalgam of various streams. The world will prosper only when all the possible streams of learning flow into the ocean of implementable mechanism.

To my pleasure, the conference under the surveillance of erudite academicians and exponential researchers is indeed the most informative, originally conceptualized and fantastically arranged presentation on the most raging issue of the time. At this educational tryst, we look forward with an angst of zeal to experiencing some unimpeachable discourse and learning a new language of trade and commerce, accentuated in compliance with information technology and Business Intelligence.

**Mr. S. Khemnath**

Editor - In – chief

International Journal Of Innovative Research & Development

## Message from ITBI-13 Convener

The competitive forces prevailing in the world of commerce today require firms to operate as efficiently and productively as possible in order to maintain and enhance market share, profitability and shareholder value. An essential element to achieving success involves the continuous enhancement of knowledge and understanding of the business environment by employees at all levels. This can be accomplished by implementing processes which augment the accessibility and communication of value added information throughout the organization. As a result there has been an increased demand for cutting-edge information technology by businesses in all industries. So, to fulfill our present and future requirements and ambitions in all respect of life, it is essential enhance our expertise to link the power of today's information technology with the tools of economic theory and business strategy. This conference aims at providing a common platform for academicians, researchers, practitioners, developers and users to disseminate knowledge, and share expertise and experience. It will also throw new lights on various developments and formulate strategy for their implementation.

The conference with the theme "Information Technology and Business intelligence" (ITBI) started as a national conference in 2007(ITBI-07). The first edition was held at IMT-Nagpur with 45 registered participants in the month of November. Since then it was decided that the ITBI will be conducted in the month of November in each year. The next edition (ITBI-08) was an international conference organized at IMT Nagpur during the month of November. The next edition ITBI-09 and ITBI-10 were also organized at IMT Nagpur having more than 150 participants. The ITBI-10 was technically sponsored by IEEE computer society and had maximum oversea participation. In 2011, it was decided to take the conference theme outside of Nagpur and ITBI-11 was held at St Anns College for Women, Hyderabad with more than 135 participants. Last year, ITBI-12 was held at IMIS Bhubaneswar, India. We have received more than 150 submissions and after review, we could select only 115 papers for presentation and publication. This Year ITBI-13 is going to be held at Jaypee University of Engineering & Technology, Guna (MP), India. This year after the review process, we could select only 65 papers out of 100 odd submissions.

My sincere thanks to JUET authorities (especially, Dr R Srivastava and Dr S Srivastava) for their kind supports and encouragement for hosting ITBI-13 at their premise. I am very much thankful to all registered participants for their interest in ITBI-13.

Hoping for a successful ITBI-13 at JUET, Guna, India.

**Dr R K Jena**

Convener, ITBI-13

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## Task Migration in Cloud Computing

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### **Abstract:**

*Heterogeneous Process Migration is a technique whereby an active process is moved from one machine to another of possibly different architecture. This necessitates the capture of the process's current state of execution and recovering it on the destination machine in a manner understandable to it. My work mainly focuses on capture and recovery of the internal state of process, comprising of the execution and data state – activation history, and static and heap data. The two major issues involved here are- the mechanism of process state capture and recovery and the initiation of the capture mechanism.*

**Key words:** Process Migration, Latency

### **1. Introduction**

Heterogeneous Process Migration is a technique whereby an active process is moved from one machine to another of possibly different architecture. This necessitates the capture of the process's current state of execution and recovering it on the destination machine in a manner understandable to it. My work mainly focuses on capture and recovery of the internal state of process, comprising of the execution and data state – activation history, and static and heap data. The two major issues involved here are- the mechanism of process state capture and recovery and the initiation of the capture mechanism.

A major issue of process state capture in heterogeneous distributed computing systems is that it cannot simply be initiated instantaneously, once a request for capture has been received. The capture can be initiated only at certain points – the points of equivalence between different instances of computation of different architectures – so that the process can be restarted at exactly at the same point where it was paused. Ideally, once the request for capture has been received, the state capture should be initiated at the very next point of equivalence encountered. At the same time, it should be ensured that the performance overhead incurred during normal execution should be insignificant. We propose a novel approach to process state capture and recovery, which achieve the above objectives.

In the case of high performance computing applications, the performance gain achieved by the elimination of polling, especially within critical loops, would be significant. Also, our solution to the heterogeneous process state capture problem is capable of effectively enabling all potential points of equivalence present in a computation if minimal latency is desired. In a polling approach, to achieve this minimal latency, poll- points would have to be placed at all potential points of equivalence, in which case, the performance overhead incurred during normal execution would reach severely unacceptable levels.

One of the central features of our approach is automatic transformation of program code to incorporated state capture and recovery functionality. This program modification is performed at the platform-independent intermediate level of code representation, and preserves the original program semantics. The attractive properties of this approach include portability, ease of use and flexibility with respect to basic performance trade-offs and application-specific requirements

### **2. Heterogeneous Process Migration**

Process Migration can be defined as the ability to move a currently executing process between different processors which are connected only by a network (that is, not using locally shared memory). The Process Migration mechanism must package the entire state of the process executing in the originating machine so that the destination machine may continue its execution. The process should not normally be connected by any changes in its environment other than in obtaining better performance.

Research in to the field of Process Migration has concentrated on efficient exchange of the state information. For example, moving the memory pages of process from source machine to the destination, correctly capturing and restoring the state of process (such as

registered contents), and ensuring that the communication links to and from the process maintained.

Careful design of an operating system's IPC mechanism can ease the migration of process. Most Process Migration systems make the assumption that the source and destination host have the same architecture. That is, their CPU understands the instruction set, and their operating systems have same set of system calls and the same memory conventions. This allows state information to be copied verbatim between the hosts, so that no changes need to be made to the memory image. Heterogeneous Process Migration remove this assumptions, allowing the source and destination hosts to differ in architectures. In addition to the homogeneous migration issues, the mechanism must translate the entire state of process so it may be understood by the destination machine. This required knowledge of the type and location of all data values (in global variable, stack frame and on the heap).[2]

### *2.1 Applications*

The traditional reasons for using Process Migration have been identified as:

#### 2.1.1. Load Sharing Among A Pool Of Processors

For a process to obtain as much CPU time as possible, it must be executed on the processor that will provide the most instructions and I/O operations in the smallest amount of time. Often, this will mean that the fastest processors as well as those executing a small number of jobs will be the most attractive. Migration allows a process to take advantage of underutilized resources in the system, by moving it to a suitable machine.

#### 2.1.2. Improving Communication Performance

If a process requires frequent communication with other processes, the cost of this communication can be reduced by bringing the processes closer together. This is done by moving one of the communicating partners to the same processing nodes the other (or perhaps to nearby processing node).

#### 2.1.3. Availability

As machines in the network become unavailable, users would like their jobs to continue functioning correctly. Processes should be move away from machines that are expected to be removed from service. In most situations, the loss of the process is simply an annoyance, but at other times it can be disastrous ( such as an air traffic control system). Reconfiguration – while administering a network of computers, it is often necessary to move services from one place to another ( for example, a name server). It is undesirable to halt the system for a large amount of time in order to move a service. A transparent migration system will make changes of this kind unnoticeable.

#### 2.1.4. Utilizing Special Capabilities

If a process will benefit from the special capabilities of a particular machine, it should be executed on that machine. For example, a mathematics program could benefit from the use of special math coprocessor, or an array of processors in a supercomputer. Without some type of migration system, the user will required to make their own decision of where to execute the process. Often users will not even be aware of their program's special needs.

#### 2.1.5. Mobile Computing

Mobile Computing is a term used to describe the use of small personal computers that can easily be carried by a person, for example, a laptop or handheld computer. To make full use of these systems, the user needs to be communicating with larger machines without being physically connected to them, normally done via wireless LANs or cellular telephones. It has been proposed that process migration is important in this area. For example, users may active a program on their laptop, but in order to save battery power or to speed up processing may later choose to transfer the running process onto a larger compute server. The process would be returned to the smaller machine to display result. These concepts can be extended to allow a program to move between workstations as its owner moves. A person may be using home computer, with large number of windows on their screen. By remotely connecting to the computer at their place of work, they will be able to continue executing those programs in their office. If they choose to move between offices, the window system (and programs) could potentially follow them.

#### 2.1.6. Wide Area Computing

For a computer to be part of the internet, it must understand the internet communication protocols. Since there are no constraints on other software, such as operating systems and programming languages, an enormous amount of heterogeneity exists. The one limitation of global computing which will never be resolved is the propagation delay that is suffered over wide area networks. At best, data can only be transmitted at the speed of light, causing noticeable delays. If a program makes frequent use of remote data, its performance will suffer. Process migration can help alleviate this problem by moving the program close to the data, rather than moving the data to the program.

Typically, the program would start executing on the user's local machine. If it later makes frequent accesses to remote data, the migration system will reduce the delay by moving the process to a machine that is physically closer to the data. This makes the most sense in the case where the program is smaller than the data.

## 2.2. The Heterogeneous Process State Capture Problem

A mechanism solving the heterogeneous process state capture and recovery problem must provide the ability to generate a checkpoint for an active process- a complete description of that process's state and point in execution. The mechanism must also support the later use of that check point to restart a process with equivalent point in execution, possibly on different type of computer from the one on which the original checkpoint was created. Figure 1 depicts the basic operation of a heterogeneous state capture and recovery mechanism.

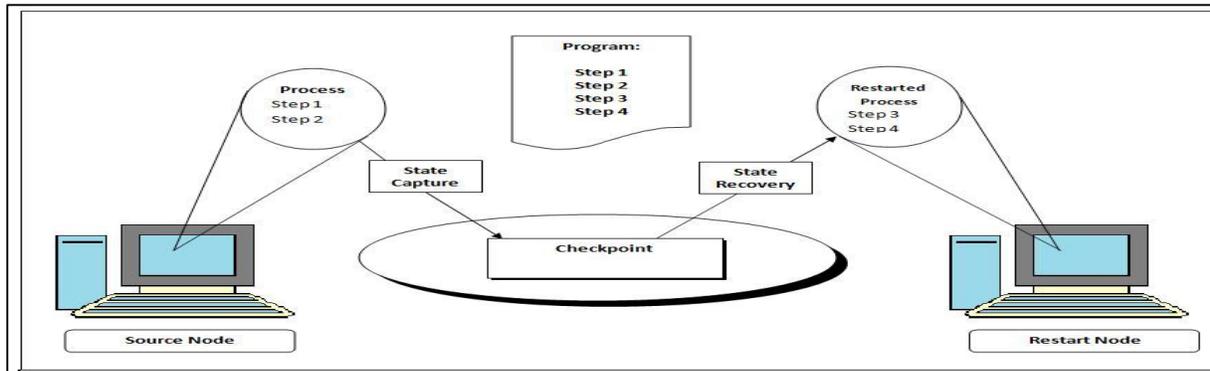


Figure 1: Operation of Heterogeneous State Capture and Recovery Mechanism

The possibility of cross-platform restart leads to the most fundamental solution constraint: the mechanism should generate platform independent checkpoints – i.e. checkpoints produced on computer system of any architecture and operating system should be recoverable on a system of any other architecture and operating system.

## 3. Task Migration

A major issue of process state captures in heterogeneous computing systems is capture initiation. Current approaches incur significant performance overhead during normal execution of the process (i.e. when state capture/recovery is not being performed) in order to ensure proper initiation of state capture. This is because of their introduction of instructions into the user code, either to poll for a capture request, or to ensure correctness of self modifying code in the case of a poll-free mechanism. In this paper, we propose a fundamentally new approach to heterogeneous process state capture and recovery that achieve minimum performance overhead during normal execution by obviating the introduction of such instructions.

In the case of high- performance computing applications, the performance gain thus achieved- especially within critical loops-would be significant. Also, our solution is suitable for effectively enabling all potential points of equivalence present in a computation if minimal latency is desired. [2]

### 3.1. The Issue of Heterogeneous Process State Capture

A mechanism solving the heterogeneous process state capture and recovery problem must provide the ability to generate a checkpoint for *active process* – a complete description of that process's state and point in execution- and also support the late use of that checkpoint to restart a process with equivalent state and at an equivalent point in execution, possibly on a different platforms from the one on which the original checkpoint was created [4]. A major issue of process state capture in heterogeneous computing systems is its initiation, once the request has been received. The process cannot simply be paused (for capturing its state) at any point of its execution, but can only be paused at points that have *equivalent points* in all the instances of the same computation on different platforms.

There are many possible points of execution equivalence that can be identified in any program. But usually, not all of these candidates would be effectively enforced as actual points of execution equivalence. This is because, in order to ensure consistency, machine dependant optimizations would need to be disabling across such enable pots of equivalence, which result in performance degradation. The selection of the subset of points of equivalence to be enabled is based on a trade-off between the performance overhead incurred during normal execution and the wait-time from request to actual initiation of the capture. Also, the possibility of cross-platform recovery lead to the most fundamental solution constraint: the mechanism should capture the state in platform- independent manner – i.e., checkpoints produced on a computer system od any architecture should be recoverable on a system of any other architecture. For example, one straightforward approach is to use an interpreted language. In these designs, the interpreter acts as a virtual machine that can artificially homogenize a system composed of heterogeneous elements. Unfortunately, such schemes severely compromise performance since they run at least an order of magnitude slower than their native code counterparts. Therefore, in our intended environment, processes run on nodes, typically executing in native code form due to performance considerations. In homogeneous systems, process state capture and recovery mechanisms can simply and directly copy the state of the process verbatim, without semantic analysis and interpretation of that state. Unfortunately, in a heterogeneous environment, the state of process cannot be

captured using this native approach because of difference in instruction sets and data representation. To mask the varying feature of processes in a heterogeneous system, a state capture mechanism must examine and capture the logical internal structure and meaning of the process state – i.e. the logical point in execution, the call stack (or call stacks, if threads are supported), complex data structures, the logical structure, and contents of heap allocated memory, and all other process state must be analyzed and captured in a platform-independent format.

### 3.2. Related Work

Although, process state capture/recovery mechanism for homogeneous computing systems are well developed and can now typically be performed with minimum overhead and latency, much less progress has been made towards providing such functionality across heterogeneous architectures. Because of the additional inherent complexity introduced by heterogeneity, very few designs for such facilities have been developed to date.

In applications such as process migration due to load balancing policies, or logging mechanism for fault tolerant systems, arbitrary long latencies would not be acceptable. In the case of load balancing, for example, the very purpose of migrating the process itself is to reduce the load on the system as soon as possible. For such applications with a minimal latency requirement, almost all potential points of equivalence present in the computation must be effectively enabled. The polling approach would not be suitable because the performance overhead due to persistence polling at all such points would reach severely unacceptable levels.

### 3.3. Objectives

- **Efficiency:** As a goal, in addition to providing efficient state capture and recovery, the run-time performance overhead introduced by the mechanism should be acceptable levels. In particular, if checkpoints are not performed during a certain period of execution, a process with state capture and recovery service available to it should not run significantly, slower than the version of the code without this service available over the same period.
- **Generality:** The mechanism should be appropriate for used with a wide range of architectures and wide variety of programs that are written in variety of languages, and that solve the wide range of problems.
- **Suitability for Minimal Latency:** The state capture mechanism should be suitable even for ensuring minimal possible latency (the time delay between when a capture is scheduled or requested and when a capture is actually initiated) which is the time taken to reach the very next *possible* point of equivalence in the computation.
- **Ease of Use:** When possible, the mechanism should be fully automatic, requiring little of no effort on the part of the application programmer. Such full automation should be possible for programs expressed in a platform-independent manner, i.e. programs that do not rely on specific hardware or software features of certain computer systems.

Now to implement the task migration algorithm, the following assumption should be considered first

### 3.4. Assumptions

- Compiler support is available for obtaining the equivalence point table.
- Operating system support is available for obtaining the current value of the program counter for a process.
- Machine dependent optimizations across enabled points of equivalence shall not be allowed since they must prevent the different compiled versions of the program across heterogeneous platforms from hitting every such point consistently.

### 3.5. State Capture Initiation Algorithm

When a request for capture of a process's state is received from an external agent, the following steps are carried out:

- The current value of the program counter is obtained using operating system support.
- The program counter value is used to identify the currently executing function and the current block (the segment of code between two points of equivalence containing the current instruction).
- The following steps are carried out for ensuring that the state capture is initiated on encountering the next point of equivalence:
  - If the program counter is exactly at a point of equivalence, an instruction to initiate state capture is placed at the same point
  - If no program control instruction lies between the current point of execution and the sequentially next point of equivalence, an instruction to initiate state capture is placed at the sequentially next point of equivalence.
  - Else, we copy and pass control to the code fragment lying between the current point of execution and the sequentially next point of equivalence, with the following modifications made for each program control instruction lying within that fragment:
    - Code is placed in place of the program control instruction to ensure that the point of equivalence that would have been encountered next, if the program control instruction were allowed to execute, is registered.
    - An instruction to initiated state capture is then placed at the end of that code,

Most importantly, the program control instruction is not allowed to actually execute- the steps that it would have carried out if it would have executed (for example, setting up a new activation record in the case of procedure call instructions), will be made to carried out, except for passing control to some point, instead of which the control is passed to the state capture mechanism. The

process is now “informed” to initiate the state capture as soon as possible. Once the process start executing latter, it eventually encounters a point of equivalence. Here, the initiation instruction (which is call to the state capture mechanism) gets executed and the control is thus transferred to the state capture mechanism.

This algorithm requires that all points in the code which are possible destinations to jump instructions should be enabled as points of equivalence. This may not be a restrictive requirement, as optimizations would anyway not be performed across jump destinations to preserve program correctness. [4]

### 3.6. State Capture Algorithm

#### 3.6.1. Once the Control Is Transferred To the State Capture Mechanism Function, the Following Task Are Performed Initially

- The point of equivalence at which and the interrupted function within which) capture has been initiated is noted.
- The return address of the current activation record is replaced by the address of the saving epilogue of the interrupted function. Finally, a return is performed so that control is passed to that saving epilogue.

#### 3.6.2. The Saving Epilogue Performs the Following Tasks

- Save the local variable and actual parameters present in the current activation record.
- Identify the caller of the current function using the return address available in the current activation record. The point of equivalence preceding the point of execution of the calling function is noted.
- The return address of the current activation record is replaced by the address of the saving epilogue of the caller function. Next, a return is performed so that control is passed to the caller’s saving epilogue.

#### 3.6.3. Step B Is Repeated Until All Activations Are Saved

#### 3.6.4. When the bottom of the activation history stack is reached, the epilogue also performs the saving of the static (global) data and the heap data

While saving activation, static or heap data, the state of pointer is captured according to its logical meaning (i.e., the data object or code point to which it is pointing) rather than its value indicating the physical address [8, 9, and 10]. In order to identify the data object being pointed, given physical address, we required one of the following:

- Compiler-support in terms of information about the positions of global within the global data area and the activation record structures of the various functions, as well as run-time support only for registering heap data.
- Run-time support for registering local, global and heap data.

For all other data types, the data is copied verbatim into the checkpoint. [4]

### 3.7. State Recovery Algorithm

Once a new process has been created on the destination machine, the following steps are carried out to perform the process state recovery:

#### 3.7.1. A Jump Instruction with Destinations as the Corresponding Restoring Epilogue Is Placed At the Entry Point of Each Function Present In the Program

#### 3.7.2. When the First Activation Record (For The Base Function) Is Created, The Corresponding Epilogue Will Restore The Static (Global) And Heap Data From The Check Point File

#### 3.7.3. The Restoring Epilogue Performs The Following Tasks

- Restore the local variables and actual parameters into the current activation record.
- If there are no more activations to be restored: The original entry point of each function is restored back.
- A jump takes place to the point in the destination’s object code corresponding to the point of equivalence (at which this function activation’s execution was frozen) noted during state capture.

#### 3.7.4. Step C Is Repeated Until All Activations Have Been Restored

This happens automatically since the point to which the jump takes place will contain a call instruction until all the activations record have been restored. (Once all the activations have been restored, the original function entry points are restored and control is transferred to the point of equivalence at which the state capture had been initiated). [4]

The process finally resumes normal execution. Again, while restoring the activation, static or heap data, the state of pointer is mapped back from its logic meaning to its value indicating the physical address on this machine. For all other data types, the source data copied into the checkpoint in now translated accordingly into the destination architecture data format mapping functions, if necessary. This is in accordance with the “receiver makes right” policy. This policy has the advantage that only one translation needs to be done (by the receiver) and there is no need for any intermediate data format representation. Also, if the state is to be recovered on the same architecture as the source, there is no need for any translation at all.

#### 4. Conclusion

This paper presents an approach to process state capture and recovery in heterogeneous computing systems that achieve minimum performance overhead during normal execution of the process. The solution presented, being poll-free, is suitable even for an application desiring minimal latency as it can afford to effectively enable all potential points of equivalence present in a computation. Also high performance computing applications can perform significantly better due to the reduced performance overhead, especially within critical loops.

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## **Integration of Indian Markets with Select Global Markets: Changing Paradigms and Dynamics**

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### **Abstract:**

*Globalization and integration of the international markets has been responsible for inseparable co-existence of time management and money flow across the world. Today it is very difficult for survive without the knowledge of our economic environment which is dynamic. The first principal of investments is to diversify and hold a well diversified portfolio in different stocks, not only in India but to have international diversification. International diversification is sought due to differences in the levels of economic growth and timing of business cycles among various countries. But due to growing international trade, investment flows, deregulation of the financial systems and growth in international capital flows, national economies have become more closely linked. . A comprehensive study on stock market integration carries a lot of importance in the present day Situation keeping into consideration both retail and institutional investors. Thus the study tries to understand the intensity of the stock market integration for diversification motives of both retail and institutional investors. The study was conducted considering five major indices of the world namely BSE 30, NSE CNX NIFTY, HANG SANG index, S&P 500, and KLSE COMPOSITE for the period 2002-13. From the study it was observed that correlation among the returns of the indices has increased over the period of time. It may be seen as first indication for the increasing interdependency and integration of the markets. All the indices considered were found to be co-integrated emphasizing the existence of long term relationship. Granger causality test show one-way and two-way integration between the indices which have considerably changed over the time period.*

**Key words:** Co-integration, Granger-Causality, Integration, Retail investors, indices

### **1. Introduction**

Globalization and integration of the international markets has been responsible for inseparable co-existence of time management and money flow across the world. Today it is very difficult for survive without the knowledge of our economic environment which is dynamic. Knowledge of the international stock market structure is crucial for both retail investors and Institutional investors. The first principal of investments is to diversify and hold a well diversified portfolio in different stocks, not only in India but to have international diversification. International diversification is sought due to differences in the levels of economic growth and timing of business cycles among various countries. But, if the stock markets of different countries move together, then investing in different national stock markets would not generate any long term gain to portfolio diversification. For an investor, International Portfolio Diversification is always considered beneficial on the assumption of low Correlations/integration among different national stock markets. But due to growing international trade, investment flows, deregulation of the financial systems and growth in international capital flows, national economies have become more closely linked. A comprehensive study on stock market integration carries a lot of importance in the present day Situation. when Indian economies are among fastest growing economies in the world. Policymakers need to understand the emerging stock market interdependence. Such an understanding will provide a better grasp of the functioning of the Indian stock markets, and allow investors and policy makers to ask various questions regarding the actual trend (i.e., constant, increasing, or decreasing) of interdependence among them. Thus the study tries to understand the extent of integration of stock markets and intensity of the stock market integration keeping in point the diversification goal of investors, portfolio managers and institutional investors.

## 2. Literature Review

The literature review points towards the fact that studies have been done on integration of various markets throughout the world. The studies try to consider the integrations among the developed countries mostly. Only recently do we observe studies leaning towards understanding the integration level among major developed and developing nations considering the impact of informational technology.

Saif Siddique (2009) examined the association between S & P CNX Nifty and selected Asian and US stock markets. The author tries to examine the integration of stock markets in longitudinal rather than cross sectional, thus adding to the literature. Interdependency among global stock markets is studied primarily through correlation of returns, Co-integration and the Granger Causality tests in this study. The study considers thirteen indices for the study which are analyzed over two time frames mainly 1999-2004 and 2004-2009. No very clear direction of relationships was found to exist in the sense of Granger Causality indicating the fact that influence of few markets, especially that of the US, has eroded over a period of time.

Silvio John Camilleri (2006) examined the "stylized facts", which are nothing but distinct characteristics of stock market data. The author examines the stylized facts such as non-stationary of price levels, autocorrelation and heteroskedastic behavior of stock prices. For the study, nine emerging market indices namely BOLSA (Argentina), CASE 30(Egypt), BSE 500 (India), JSE Index (Jamaica), LITIN (Lithuania), SBI 20 (Slovenia), MSE Index (Malta), SEMDEX (Mauritius), and TSEC 50 (Total Return) (Taiwan) were considered. The results do not disclose asymmetry in the tails of log return distributions in any particular direction. In addition, it is not confirmed that high volatility tends to follow large negative returns. The empirical results confirmed that stock price levels are often non-stationary and that it is more reasonable to transform the data into logarithms.

Debjiyan Mukherjee (2007) examined the integration of Indian stock markets with select few international indices by examining the trends, similarities and patterns in activities and movements. For the study, five stock markets based on specific qualitative attributes were classified namely Market capitalization, Number of listed securities, Listing agreements, circuit filters and settlement. The stock exchanges considered were NSE, NYSE, Hang Seng, Russian and Korean. The study was conducted for the period 1995-2006. To test for integration of the markets, statistical methods such as correlation analysis, exponential trend analysis and the risk-return analysis was used. It was observed that when compared to Russian stock markets, NSE was observed to be more volatile in nature. NSE mainly rose because of tech boom till mid of 2000 which detrended back by 2001. Interest rate regimes and other macroeconomic factors were found to be responsible for consistent uptrend of NSE. From the study it was found that Hang Seng though very volatile in nature had less correlation with the Indian markets upto 2003. Hang Seng rose during 1996 because of east Asian miracle. By year 2000, the index had crashed due to fear of recession. But, it was found that Hang Seng index and NSE were reacting almost identically after 2003 which means larger integration of the Indian economy in the foreign market and impact of investments by FIIs and other foreign investors. NSE and NYSE markets were found to be highly correlated after mid 2000 reflecting the beneficial effect of tech boom on both the markets. NSE and Korean stock exchanges are found to be highly correlated though east Asian crisis had more impact on Korean stock exchange due to its integration with east Asian economies. The study finds conclusive evidence of integration of the Indian markets with the global markets much more in the recent years (mainly after 2006) than the previous years as India before 2000 was in its inception stage as a globalized economy, thus being directly protected from foreign exposure.

Masih, M.M. Abul and Masih, Rumi (1997) examined the dynamic linkage patterns among national stock exchange prices of four Asian newly industrializing countries - Taiwan, South Korea, Singapore and Hong Kong. The sample consisted on closing daily share price indices data of the four stock markets from January 1982 to June 1994. They concluded that the study of these markets are not mutually exclusive of each other and significant short-run linkages appear to run among them.

Agarwal, R N (2000) examined the impact of financial integration on Indian capital markets in terms of growth, volatility, and market efficiency. The study mainly concentrates on the major regulatory and macroeconomic factors which were responsible for the growth of Indian primary and secondary markets in India mainly after the economic reforms in 1990. The study also examines the market efficiency and random walk theory of Indian stock markets by considering a sample of nine major industries and Reserve Bank of India (RBI) monthly index of ordinary shares for the entire industrial sector as a representative of market behavior for the period April 1994 to March 1999. The study considers the Capital asset pricing model (CAPM) to analyze the theory of random walk. Government Treasury bill for 91 days is used as a riskless rate of return. The study finds significant differences in the beta values before and after the economic reforms of 1990 among many sector industries. The beta values which were significantly high in textiles, cement and electricity generation sectors during 1988-89 to 1990-91 is found to disappear with beta values being seen higher in metal & metal products, finance and investments industries. The author explains this phenomenon by the impact of southeast Asian financial crisis on other developing countries. The study concludes that Indian stock markets are still poorly integrated with the developed international capital markets, hence providing huge opportunity for investors to diversify their portfolio.

## 3. Problem Statement

From the literature review we can conclude that the level of integration of Indian stock markets with the other developed and developing countries after economic reforms in 1990 has significantly improved. Advent of information technology and telecommunications industry has significantly diminished the chances of finding arbitrage opportunities for making profits in both primary and secondary markets for investors. The recession caused due to sub-prime crisis had its impact throughout the globe. If Indian markets integration with rest of world has significantly improved during recent times then the impact of recession will percolate into Indian stock markets. Thus the study concentrates on understanding the level of integration of Indian stock markets with global indices and the cause and effect relationship that exists between the markets.

#### 4. Objectives of the Study

- To examine the long run relationship between the Indian stock markets with global markets.
- To examine whether Indian stock markets have causal effect with global markets.
- To analyze the impact of global recession on Indian stock markets.

#### 5. Hypotheses of the Study

- For the study, following hypotheses were tested namely;
- $H_{01}$  = There is no change in the short run relationship between NIFTY and global markets.
- $H_{02}$  = There is no long run relationship between Nifty and global indices
- $H_{03}$  = There is causality effect between NIFTY and global markets.
- $H_{04}$  = There is no significant increase in volatility of NIFTY returns after recession.

#### 5. Data Collection

For the study, data of five major market indices namely India, USA, Malaysia and Hong Kong were considered for the study. A representative market index from each country was chosen for the study. The indices considered were BSE Sensex, NSE Nifty, Hang Sang index, S& P 500 and KLSE composite index. The daily closing prices of all indices were collected from YAHOO.COM and respective market stock markets websites for a period from January 2002 to January 2013.

#### 6. Research Methodology

The overall period 2002-2013 was divided into two sub-periods namely period-I which designates the stock markets before recession (January 2002-January 2007) and period II which designates the stock markets after the recession (January 2007- January 2013).

The returns of daily closing prices for the period are computed as shown below:

$$r_t = \ln (P_t/P_{t-1})$$

Where  $r_t$  refers to returns on the closing prices,  $p_t$  refers to closing prices of indices on day  $t$  and  $p_{t-1}$  are the closing prices on the indices on day  $t-1$

Descriptive statistics mainly the mean, standard deviation, skewness, kurtosis was examined was each indices. Jarqua-Bera statistic and Durbin Watson statistic were examined to observe if the indices considered were normally distributed and whether or not serially correlated respectively.

To understand the short run relationship between Indian markets and global markets, correlation between the indices was computed using the following equation:

$$\rho_{X,Y} = \frac{\text{cov}(X,Y)}{\sigma_X \sigma_Y} = \frac{E[(X - \mu_X)(Y - \mu_Y)]}{\sigma_X \sigma_Y}$$

Where  $\text{Cov}(X,Y)$  represents covariance between the two indices and  $\sigma$  represents the standard deviation. Correlation coefficients vary between -1 to +1 indicating the level of integration between the indices over a short period of time.

To examine if there exists long run relationship between the indices, co-integration method was followed.

Economically speaking, the two variables (X and Y) are said to be co-integrated if they have a long-term, or equilibrium, relationship between them. (Damodar Gujarati, 2004). The test involves estimating the following pair of equations

$$Y_t = \beta_1 + \beta_2 X_t + \mu_t \dots\dots\dots(1)$$

$$\mu_t = Y_t - \beta_1 - \beta_2 X_t \dots\dots\dots(2)$$

As observed in the co-integrating regression in equation-1,  $Y_t$  and  $X_t$  are the times series considered and '  $\beta_2$ ' is the coefficient parameter.  $\mu_t$  is the 'noise' term reflecting other factors that influence dependent variable. We considered the all the time series to be integration to order 1, i.e. I(1). If  $\mu_t$  is subjected to unit root analysis and if we find it is stationary, that is, it is I(0), we can conclude that the linear combination cancels out the stochastic trends in the variables considered and the two variables are co-integrated. Thus, long term relationships between all the indices were calculated.

Although regression analysis indicates nature of relationship, it does not necessarily imply causation or direction of influence. Thus in order to understand the causal effect, Granger-causality test was conducted. Granger causality test assumes that the information relevant to the predication of the variables is solely contained in the data collected. (Damodar Gujarati, 2004)

The test involves estimating the following pair of regressions

$$X_t = \sum_{i=1}^n \alpha_i Y_{t-i} + \sum_{j=1}^n \beta_j X_{t-i} + \mu_{1t} \quad \dots\dots\dots(3)$$

$$Y_t = \sum_{i=1}^n \lambda_i Y_{t-i} + \sum_{j=1}^n \delta_j X_{t-i} + \mu_{2t} \quad \dots\dots\dots(4)$$

Where it is assumed that disturbances  $\mu_{1t}$  and  $\mu_{2t}$  are uncorrelated. Thus the equation 3 postulates that variable X is related to past values of itself as well as that of variable Y and equation 4 postulates the similar behavior for variable Y. From the regression analysis, we distinguished the relationships by four cases namely;

- Unidirectional Causality from X to Y is indicated if the estimated co-efficients on the lagged X in equation-3 are statistically different from zero as a group and the set of estimated coefficients on the lagged Y in equation-4 is not statistically different from zero.
- Conversely, unidirectional causality from Y to X exists if the set of lagged X coefficients in equation-3 is not statistically different from zero and the set of the lagged Y coefficients in equation-4 is statistically different from zero.
- Feedback, or bilateral Causality is suggested when the sets of X and Y variables coefficients are statistically significant different from zero in both regressions.
- Finally, independence is suggested when the sets of X and Y variables coefficients are not statistically significant in both the regressions.

Thus, if variable X (Granger) causes Variable Y, then changes in X should precede changes in Y. Therefore, in a regression of Y on other variables (including its own past values) if we include past or lagged values of X and it significantly improves predication of Y, then we can say that X (granger) causes Y And Vice verse.

## 7. Data Analysis And Interpretation

The descriptive statistics for the period-I (2002-2007) and period-II (2008-2013) for all the indices is shown in Table 1. We can observe clearly that the returns in the period –II has drastically reduced after the recession. The returns of all the indices show a large variation. The volatility, in terms of standard deviation has shown significant decrease indicating the heavy losses suffered by the investors and therefore lost interest in the stock markets. Thus the period-II shows increased activity from centralized, institutional major players. The significant changes in the returns and volatility, points towards impact of recession which originated in USA to have an impact on all the stock markets returns as a whole. Considering the Jarque-Bera Statistic and its probability, the returns seem to be not normally distributed which points towards considering the issues of stationarity mainly autocorrelation and heteroscedasticity. It was thus necessary to determine whether the return series of the indices were stationary or not. In Figures 1 to 5 we plot the closing prices and returns of all the indices. At first glance, the return series appears to be stationary in nature with zero mean but with variability in the intensity of the returns.

As a formal test of stationarity, we use Augmented Dickey-Fuller (ADF) test. The ADF test which is common for determining unit roots. The ADF test which consists of regressing the first difference of the series against a constant, the series lagged one period, the differenced series at n lag lengths and a time trend (pindyck and Rubinfeld, 1998, p. 509) rejects the null hypothesis of non-stationarity at 1 percent level of significance. The ADF test statistic values are well below the critical values at 1 percent level of significance and also showing consistency with different lag structures and to the presence of the intercept or intercept and trend.

To understand if there existed long term relationship between the indices, co-integration test was conducted. Co-integration is a property of two or more variables moving together through time, and despite following their own individual trends will not drift too far apart since they are linked together in some sense. The results of the unit root test show that the time series of indices of share prices related to various stock exchanges under study are I (1). Therefore, co-integration will be a suitable means for correctly testing hypotheses concerning the long-term relationship among the time series under the study. It tests a set of null hypothesis that there exist no co-integrating equations among variables. The results of co-integration test for the period-I and period-II are shown in Table 3 and Table 4.

From the cointegration results, we can interpret that there exists long term relationship between the indices considered. But, we wanted to analyse what kind of causal relationship exists between these indices. Does clues from Indian markets impact other markets or is it the other way round. For the analysis considering the series as stationary, the test was performed on the level values of all the indices. The number of lags to be considered is decided based on Schwarz information criteria and Akaike information criteria. To the null hypothesis of no granger causality between the indices, the following results were obtained as shown in Table 5. We can infer that Indian markets are definitely impacted by the clues from US markets and Hong Kong market which are the major stock markets. Malaysian markets does not seem to have an impact on Indian markets as information is already assimilated from the Hong Kong

market. We can observe that with growing importance of Hong Kong market in the asia pacific region, the effect of American markets on Indian markets is diminishing which is reflected in no casual effect in period-II.

### 8. Finding Of The Study

- The standard deviation of all the major indices considered were found to be significantly reduced in terms of volatility which points towards effective information assimilation among the major economies and impact of recession on major stock markets. This is one way of understanding globalization and integration of global markets.
- Correlation among the returns of the indices under study has increased in all possible correlations. It may be seen as first indication for the increasing interdependency among them.
- All the indices considered were found to be non stationary in nature and thus required treatment of ADF test to make it stationary. Thus the indices were integrated to the order one.
- Co-integration/Long run relationship exists between Indian markets with other major markets mainly the US and Hong Kong Market. But it is evident that the influence of US markets is diminishing due to raising popularity of Hong Kong markets throughout the world as a major market in asia-pacific region.
- It was observed that though there exists long run relationship between Indian markets with other markets, the influence of Hong Kong market is gaining ground as a major market in asia-pacific region.

### 9. Conclusion

The study aimed at understanding the level of integration of the Indian stock markets with the major global markets. The study also aimed at understanding the causality effects in various indices across the world in context of globalization and increased improvements in information technology. The study definitely finds aspects of efficiency in the Indian stock markets on a stand alone basis. It is clearly evident that Indian stock markets are integrated with global markets, more so in the recent time, i.e, post-2007 but it is observed that the impact of US stock markets directly on Indian markets is fading away which is replaced by Hong Kong market. The increased integration of Indian markets with the global markets may be due to Globalization, Advent of information technology and mainly increased cross-holding (Debjiban Mukherjee, 2007) maybe also the reason. Cross-Holding is basically a situation in which a publicly-traded corporation owns stock in another publicly-traded company. So, technically, listed corporations own securities issued by other listed corporations. Thus, increasing the degree of integration in different dimensions in the recent times. Information technology also has played a very key role in integration of the markets throughout the world. The automation of the exchanges has played a vital role in making the financial markets integrated in the long run. The integration of the markets is also amplified by the issuing of ADRs and GDRs, along with increased liberalization of the various economies across the globe. Increased trade and the rise of Multinational corporations have contributed immensely to the integration process. Thus, from the study we can conclude that from an investor perspective, the strategy of diversification globally to make abnormal profits is slowly losing importance. With integration of the markets by automation, global markets today are operating seamlessly for 24 hours a day with opening of the markets in different time zones at various points of time. Thus we can conclude that global markets have definitely integrated to a larger extent with Indian stock markets. The magnitude of movement in Indian stock markets as a result of global clues is definitely a fact to be considered seriously by all the investors.

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## 11. Appendix

	<b>BSE</b>	<b>NIFTY</b>	<b>HANGSENG (MALAYSIA)</b>	<b>KLSE COMPOSITE</b>	<b>S&amp;P 500</b>
Mean	0.026075	0.024580	0.010461	0.009296	0.005938
Median	0.033088	0.030208	0.011297	0.012245	0.010538
Maximum	0.157417	0.163752	0.088349	0.114077	0.086449
Minimum	-0.1583448	-0.173988	-0.096742	-0.103112	-0.110024
Std.Dev	0.064470	0.067000	0.043252	0.039434	0.034670
Skewness	-0.562310	-0.545848	-0.517908	-0.000601	-0.676850
Kurtosis	3.132509	3.315848	2.795055	3.736749	4.775400
Jarque-Bera	3.205824	3.228883	2.787288	1.357000	12.46138
Probability	0.201309	0.199002	0.248169	0.507378	0.001968

*Table 1: Descriptive Statistics of Five Indices for the Period 2002-2007*  
Source: Authors

	<b>BSE</b>	<b>NIFTY</b>	<b>HANGSENG (Malaysia)</b>	<b>KLSE Composite</b>	<b>S&amp;P 500</b>
Mean	0.007901	0.008409	0.004461	0.003852	0.001690
Median	0.003071	0.005519	0.013479	0.009061	0.009603
Maximum	0.282551	0.280660	0.170737	0.135454	0.107723
Minimum	-0.238901	-0.264103	-0.224661	-0.152226	-0.169425
Std.Dev	0.081608	0.082737	0.076608	0.042670	0.052092
Skewness	0.098322	-0.050199	-0.332126	-0.481395	-0.610765
Kurtosis	4.634993	4.924611	3.448506	5.437353	3.607230
Jarque-Bera	7.909623	10.83311	1.873634	20.03067	5.427525
Probability	0.019162	0.004442	0.391873	0.000045	0.066287

*Table 2: Descriptive Statistics of the Major Indices for the Period 2008-2013*  
Source: Authors

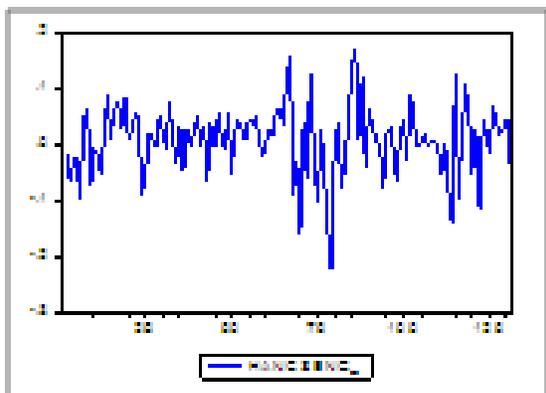


Figure 1: Returns Of Hang Seng For Period 2008-13

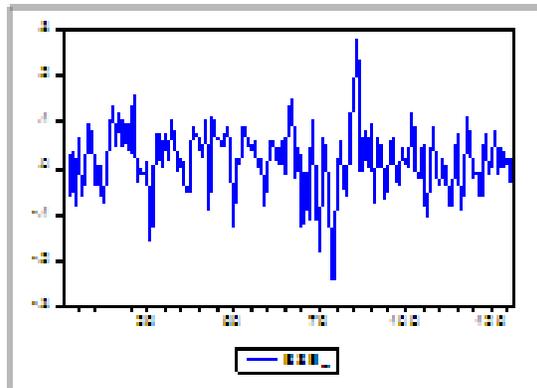


Figure 2: Returns Of SSE For Period 2008-13

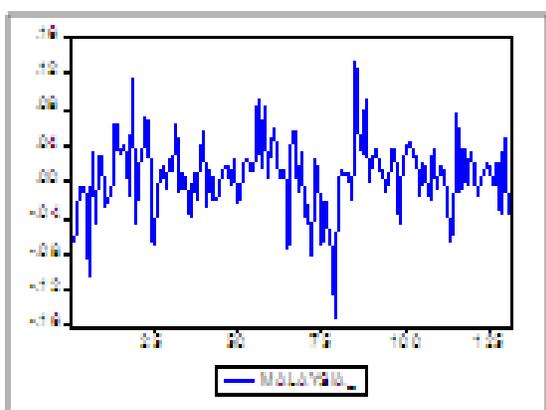


Figure 3: Returns Of HSI For Period 2008-13

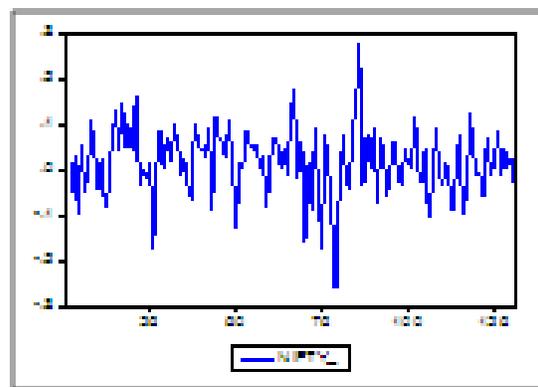


Figure 4: Returns Of SSE For Period 2008-13

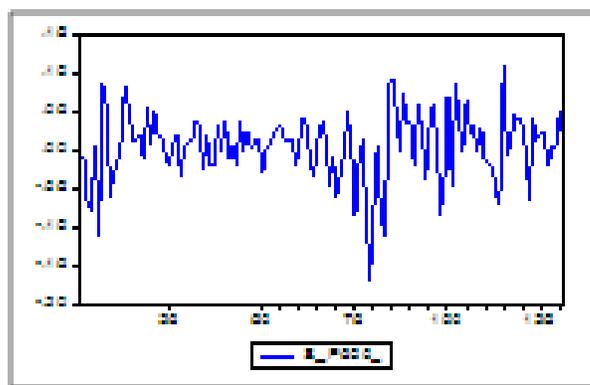


Figure 5: Returns Of S&P 500 For The Period 2008-13

Figure 1-5

<b>Unrestricted Cointegration Rank Test (Trace)</b>				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.637013	124.3224	69.81889	0.0000
At most 1 *	0.421503	66.55929	47.85613	0.0004
At most 2 *	0.258708	35.36196	29.79707	0.0103
At most 3 *	0.211384	18.29840	15.49471	0.0184
At most 4 *	0.080154	4.762294	3.841466	0.0291
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
<b>Unrestricted Cointegration Rank Test (Maximum Eigenvalue)</b>				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.637013	57.76313	33.87687	0.0000
At most 1 *	0.421503	31.19733	27.58434	0.0164
At most 2	0.258708	17.06356	21.13162	0.1690
At most 3	0.211384	13.53610	14.26460	0.0649
At most 4 *	0.080154	4.762294	3.841466	0.0291
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 3: Co-Integration Test Results For the Period –I

<b>Unrestricted Cointegration Rank Test (Trace)</b>				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.574026	137.5319	69.81889	0.0000
At most 1 *	0.329522	77.79548	47.85613	0.0000
At most 2 *	0.295703	49.81197	29.79707	0.0001
At most 3 *	0.200768	25.27313	15.49471	0.0012
At most 4 *	0.127978	9.585858	3.841466	0.0020
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
<b>Unrestricted Cointegration Rank Test (Maximum Eigenvalue)</b>				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.574026	59.73646	33.87687	0.0000
At most 1 *	0.329522	27.98351	27.58434	0.0445
At most 2 *	0.295703	24.53883	21.13162	0.0159
At most 3 *	0.200768	15.68727	14.26460	0.0296
At most 4 *	0.127978	9.585858	3.841466	0.0020
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 4: Co-Integration Test Results for the Period-II

Symbol	HANGSENG		MALAYSIA		NIFTY		S_P500		BSE	
	I	II	I	II	I	II	I	II	I	II
HANGSENG	--	--	0	0	↔	0	0	0	↔	0
MALAYSIA	→	0	--	--	0	0	0→	0	0	0
NIFTY	↔	→	0	0	--	--	↔	0	0	0
S_P500	0	0	0	0	↔	0	--	--	↔	0
BSE	↔	0→	0	0	0	0	↔	0	--	--

Table 5: The Results of Granger-Causality Test For the Period I and Period II Respectively For All Indices

**Note. 1:** → denotes Causality from one side /market having impact on other markets, whereas ↔ means Causality from both sides and '0' is put for no causality between the indices.

**Note 2:** The precise table is formed from the analysis of Granger Causality between the indexes



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## Implication of Training and Development in Educational Sector: Thrust on Retention of Academic Staff

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### **Abstract:**

*A true educational institution shall struggle for promoting values and fostering culture that facilitates academic atmosphere and competency development among all staff in the learning process. The fact is that management support the development, even the awareness is there among staff but because of personal reasons the faculty does not come up. Faculties have no self motivation for development. The pressure of the overall system is so much thus not making continuous development feasible for the teaching staff. We need to refresh our education system for faculty enhancement.*

*It is assumed that training is a valuable activity for enhancing skills and improving staff performance and that training can address some of the factors contributing to staff retention, such as job satisfaction, motivation and career growth. Training alone cannot address all of the factors contributing to staff retention, however, it is reasonable to assume that training can play a role in improving retention, but it may not be sufficient to improve retention if other systematic barriers are not addressed like organization culture, staff relations, available resources.*

*The study have shown that the investing in training is one of the ways an institute can help retain staff, while reaping other benefits. The study is carried out in four educational institutes in Nagpur which strongly believes on the training effectiveness. Data has been collected through the process of interviewing higher authorities and staff of the institutes as well as by conducting questionnaire survey for staff. Samples of staff for survey is selected randomly, whereas samples of higher authorities for interview are selected according to convenience, as approval and support of the participating institutes for the study was a factor not under the control of the researcher. Institutes' records have helped a lot to reach to conclusion. After collection of data, that data has been systematically pooled for further analysis. Hypothesis testing has been done with the help of ANNOVA test.*

**Key words:** Training, retention, job satisfaction, motivation, career growth

### **1. Introduction**

Intensive, focused, practical, and highly interactive courses will provide an ample opportunity to address concerns of current faculties. The Advanced Faculty Training program aims to provide practical experience to faculties in various fields. The methodology can later be utilized by the faculties to develop and design individual syllabus structures for their students, specific to their area of teaching. This can facilitate enhancing the current pattern to a level wherein more of real time exposure can be provided.

Candidates fresh from their colleges are appointed as faculty members. Such new faculty members when introduced to the methods of teaching, student psychology and approaches of teaching the concepts and fundamentals in technology, it affects directly the attrition rate in educational institutions.

The developments in technology and skills are continuously happening and new subjects are introduced and curriculum is updated in a continuous fashion to cope up with the requirements of the industry and society. In such situations even the existing faculty members in educational sectors should be updated and trained for new subjects and skills.

The faculties in the present scenario are expected to play multiple roles such as: facilitator of learning curriculum and course planner, resource material creator, student assessor, mentor and program evaluator. Quality teachers with passion for teaching are inevitable in any education system. The rapid application and evolution of new teaching technologies present challenges for teaching staff to stay updated of developments while also pursuing their professional and research responsibilities. To address this problem interventions are required to ensure that the new incumbents who enter teaching service meet their capacity building and skill development through in service training. Professional development programmes are key tools that help faculty to learn the current issues in education better

respond to cultural and systemic changes to delivery formats and refine their performance. The task of attracting more and more students to higher education has become difficult. It is a challenging task to induct them into higher education in a meaningful and fruitful manner. In order to address these challenges we need not only more and more educational infrastructure, but also more importantly, human resources both in terms of number and quality.

With the growing awareness of the importance of teaching and learning in Universities, the need to improve professional qualities in faculties has been identified. This paper describes the impact of training on faculty retention .

## 2. Objectives

- To analyze the relation between training and staff retention.
- To study the effectiveness of training programs on job satisfaction, motivation & career growth of academic staff.

## 3. Review Of Literature

Employee turnover is highest among employees who are not satisfied with their jobs. Because qualified employees are becoming more scarce and difficult to retain, organizations need to focus on increasing employee satisfaction. Suggests that one useful approach for increasing employee satisfaction is to view workers as customers. Based on the notion of employee as customer, illustrates how a customer satisfaction measurement approach can be applied to the measurement of employee attitudes. Suggests that the metaphor of employee as customer is indeed useful. Also demonstrates how this approach yields actionable results that managers can implement to increase employee satisfaction and thereby retention.

Roland T. Rust, Greg L. Stewart, Heather Miller, Debbie Pielack, (1996) "The satisfaction and retention of frontline employees: A customer satisfaction measurement approach", *International Journal of Service Industry Management*, Vol. 7 Issue: 5, pp.62 – 80

A positive, fulfilling, affective-motivational state of work-related well-being that is characterized by vigour, dedication, and absorption. Although there are different views of work engagement, most scholars agree that engaged employees have high levels of energy and identify strongly with their work. Engagement is a unique concept that is best predicted by job resources (e.g., autonomy, supervisory coaching, performance feedback) and personal resources (e.g., optimism, self-efficacy, self-esteem). Study have shown that work engagement is predictive of job performance and satisfaction.

Arnold B. Bakker, Wilmar B. Schaufeli, Michael P. Leiter & Toon W. Taris, "Work engagement: An emerging concept in occupational health psychology" *An International Journal of Work, Health & Organizations* Volume 22, Issue 3, 2008 pp 187-200

The relationship between the employees' job performance and their retention also varied significantly with organizational culture values. The cultural effects were stronger than the combined exogenous influences of the labor market and the new employees' demographic characteristics.

John E Sheridan "Organizational culture and employee retention", *Acad Manage J* December 1, 1992 vol. 35 no. 5, 1036-1056.

The above literatures discussed about employee engagement, job performance, job satisfaction and their retention in manufacturing organizations where as this paper try to analyze the relationship between training and retention of teaching staff in educational institutes.

## 4. Research Hypothesis

- Null Hypothesis  
Retention in all academic institutes are equally proportionate and training is equally effective for retention of teaching staff.
- Alternative Hypothesis  
Retention in all academic institutes are not equally proportionate and there is no relationship between training and retention of teaching staff.

## 5. Research Methodology

Study is carried out by taking into consideration the opinions of teaching staff from four educational institutes in Nagpur. Interviews are conducted with the senior authorities at the institutes with day-to-day responsibility for smooth working of institutes. For questionnaire survey, sample of 84 faculties were selected out of a pool of 100 (with margin error of 5% and confidence level of 95%). Samples are representatives of different departments.

ANNOVA test has been used to analyze the collected data.

## 6. Analysis and Interpretation

Factors Having Impact Of Training	Institute A	Institute B	Institute C	Institute D	Total
Job satisfaction	6	4	8	6	24
Motivation	7	6	6	9	28
Career growth	8	5	10	9	32
Total	21	15	24	24	84

Table 1: Opinions of Academic Staff

- i) Correction factor =  $(84)^2/12 = 588$
- ii) SST = Total sum of square – C  
 $= \{(6)^2 + (7)^2 + (8)^2\} + \{(4)^2 + (6)^2 + (5)^2\} + \{(8)^2 + (6)^2 + (10)^2\} + \{(6)^2 + (9)^2 + (9)^2\} - 588$   
 $= 624 - 588$   
 $= 36$
- ii) SSC = Sum of square between Institutes – C  
 $= [ \frac{(21)^2}{3} + \frac{(15)^2}{3} + \frac{(24)^2}{3} + \frac{(24)^2}{3} ]$   
 $= 609 - 588$   
 $= 18$
- iii) Sum of squares between factors affecting training – C  
 $= [ \frac{(24)^2}{4} + \frac{(28)^2}{4} + \frac{(32)^2}{4} ] - 588$   
 $= 596 - 588$   
 $= 8$
- iv) Error sum of squares =  $36 - 18 - 8$   
 $= 10$

Sources Of Variation	Degree Of Freedom	Sum Of Square	Mean SS= $\frac{S.S}{DOF}$	F calculated	F(table)at 5%
Between Institutes	3	18	MSC=18/3=6	MSC = 3.6 MSE MSR = 2.4 MSE	4.76
Between Factors having training impact	2	8	MSR=8/2=4		5.14
Error	6	10	MSC=10/6=1.667		
Total	11				

Table 2: Factor Calculation

**7. Result**

Calculated Factor value is less than table value.

So Null hypothesis is accepted. Retention in all academic institutes are equally proportionate and training is equally effective for retention of academic staff.

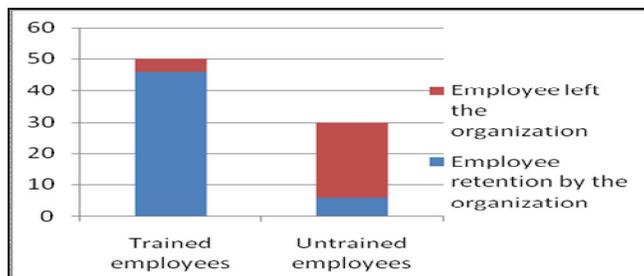


Figure 1: Graphical Representation for Analysis of Academic Staff With Respect To Their Retention Capacity

Training can have an indirect effect on performance if it increases job satisfaction by, making it easier for faculties to perform the job effectively or feel more valued. In contrast, if faculties feel dissatisfied they may react in a number of ways. Thus, through a sense of loyalty they may stick it out; neglect their responsibilities towards the institute by absence, lateness and reduced effort.

There is negative correlation coefficient between job satisfaction and staff turnover. However, correlation does not always imply job satisfaction was positively and significantly related to the probability of quitting. Job satisfaction was quantitatively more important than financial gain. The causality ran from job satisfaction to future quitting behavior. The effect of job satisfaction on faculty future quit behavior- results that faculties who reported dissatisfaction with their jobs were statistically more likely to quit than those with higher levels of satisfaction achieved through training programs. Dissatisfaction with the career growth found to be the aspect most likely to lead to the faculties leaving their job.

All respondents found the faculty training to be very useful for improvement of teaching skills. They found that the skills learnt in the training workshop were very applicable; they perceived changes in students' classroom behavior and found their lecture to be more participatory and interactive. As for their own change in behavior, respondents experienced better interaction with the students in classroom. All these factors ultimately help to improve the faculty morale which has resulted in high retention of faculties. The overall impression of the training was very positive.

### 8. Conclusion

There is clear evidence that training is positively associated with job satisfaction, motivation and career growth.

To motivate staff, educational Institutes need to create the opportunity for staff members to satisfy their "growth & development need". Development is now considered as gaining new skills and taking advantage of many different methods of learning that benefit staff and institute alike. Staff benefit by experiencing greater satisfaction about their ability to achieve results on the job and by taking responsibility for their career; the institute benefits by having staff with more skills who are more creative. The availability of skill development opportunities and career movement are "key attractors" to educational institutes. If an Institute does not recognize the individual's need and desire to grow, then "development" becomes a primary reason for resignation.

To maintain the interest of the present staff, an institute should demonstrate through training that current employees will have at least an equal chance in the competition against outsiders for new positions.

### 9. Practical Implications

The research confirms that faculty training program is advantageous for academic institutes since it has a positive influence on institutional performance. The impact on staff retention is indirect through quality performance, suggests that the institutes have to take that view of quality performance into consideration which is possible through training programs.

### 10. Originality/Value

The paper is valuable for academics and professional because the impact of faculty training program on institutional performance has been confirmed for staff retention. Its originality is in the measurement of institutions' staff retention with respect to training, for which a more detailed specification of institutional performance based on the job satisfaction, motivation and career growth concepts has been used and analyzed with the help of statistical calculations through ANNOVA test.

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## **Data Mining For Social Research: A Study of Nutritious Food Consumption of Indian Households**

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### **Abstract:**

*There are various approaches to measure the differences in household income. Income measured from the monetary earnings point of view is called the nominal income. Income measured from the consumption point of view i.e. the basket of consumption goods a household buys is called the real income. In this paper we analyze the income based on the consumption of Highly Nutritious Food. Using tools of data mining (C&R tree and C5.0) we predict the trends in expenditure of households of India in the consumption of Highly Nutritious Food (Pulses, Cereal Products, Meat, egg, milk and milk products) which are not available through the Public Distribution System (PDS). We study the differences in expenditure on Highly Nutritious Food (HNF) across caste, religion, states and demonstrate that multiple factors influence the expenditure on HNF. We also categorize the per capita consumption of HNF as Low, Average and High. The outcome shows disparity in consumption of Highly Nutritious Food and argues that it can be a way to look at income disparity.*

**Key words:** *Highly Nutritious Food (HNF), Per Capita Consumption of Nutritious Food (PCCNF), Households, Caste, Religion, Data Mining, C&R Tree, C5.0*

### **1. Introduction**

Among households of India, there have been inequalities in income since ancient times. This inequality persists in the nominal income, consumption, social status, welfare etc. In this paper we study one such inequality based on the inequality of consumption of Highly Nutritious Food (Pulses, Cereal Products, Meat, egg, milk and milk products) which are not available through the Public Distribution System (PDS). With the rising food prices, food expenditures are increasingly dominating the household budget. The households are forced to reduce their consumption basket and depend solely on the basic food for their nutritional requirement. This issue is more severe and pronounced when we study the differences in expenditure on HNF among the Indian households.

This paper proposes to review the trends in expenditure on HNF's using various input and outcome measures. This is an alternative approach to study the differences in income among households. Households with low incomes would tend to consume less of HNF and depend more on food available through PDS. This paper also identifies the differences in income based on consumption of HNF among households with different sources of income (like agricultural, non agricultural labour, artisan, service, business etc). It tries to investigate whether holding a ration card creates any incentive to consume more of HNF. There is also a difference in consumption of HNF among different regions of India (North, South, East, West, Central and North East) as discovered from the data. There are various other interesting findings which will be discussed subsequently.

Findings of the research incorporated in this article are based on the household data from India Human Development Survey, 2004-05 (IHDS). The IHDS is a nationally representative survey of 41,554 households organised by researchers from the University of Maryland and the National Council of Applied Economic Research. It is a multi-topic multi-purpose survey containing information about a variety of dimensions of social and economic well being of the house-holds. These data are in public domain and at an all-India level, poverty, education, household structure and employment levels recorded in this survey are comparable to those recorded by Census and the National Sample Survey albeit with some exceptions associated with the survey design (Desai et al 2010)

## 2. Literature Review

The problem of differences in income has been addressed by various authors, but very less literature is available about the differences in consumption of HNF. Most of the study in this area is based on earnings point of view and on per capita calorie consumption from the expenditure point of view. Few of them are "Income inequality in village India: The role of caste" by Swaminathan and Rawal (2011), which examines the role of caste in understanding inequality in incomes in rural India. In the paper "Regional Heterogeneity in Food Consumption and Nutrition Intake in India" Srivastava et al, the authors raise the issue of difference in consumption of cereal crops across Indian states. In their article "Food and Nutrition in India: Facts and Interpretation" Deaton and Dreze (2009) analyze per capita consumption from the calories perspective.

## 3. Understanding The Problem

The Indian social system is characterized by various social groups or Caste. The New Shorter Oxford Dictionary defines caste as "a Hindu hereditary class of socially equal persons, united in religion and usually following similar occupations, distinguished from other caste in the hierarchy by its relative degree of purity or pollution" [Ed Lesley Brown, Clarendon Press, Oxford, 1993]. In the data the caste is categorized as Brahmin, Scheduled Caste (SC), Scheduled Tribe (ST), Other Backward Class (OBC), others.

Caste system dominates a larger part of decision making in the Indian household scenario. A person of the Brahmin caste enjoys the supreme position and is generally well-off. The others are the people who are not Brahmins but club together with Brahmins to form the General Category. The Scheduled Caste are people who were historically disadvantaged and were considered untouchables. Scheduled Tribes are the ethnic tribal groups. Other Backward Class are socially and educationally backward communities.

India is a secular country. People following various religions, Hindu, Muslim, Sikh, Christians, Jains, Buddhists, Tribals etc all live in harmony. The vast landscape of India is divided into 28 states and seven union territories. No socio-economic study on India can be complete without taking in account the influence of Caste, Religion and Region in their decision making.

This study is important and unique in various aspects. Firstly, No study has been done to assess the differences in consumption expenditure across household based on highly nutritious food consumption. Most studies till now have focussed on only calorie intake and minimum calorie requirement. Here, we argue that calorie intake is necessary, but getting calories only from rice and wheat makes consumption monotonous. Even the poorest of the poor household consumes rice. But its consumption of HNF is limited due to its inability to purchase them. As income rise the consumption decisions also change and the expenditure on HNF's increase.

Having focussed on the Indian households, the point to investigate is whether the rise in income is treated as the same by people of all caste, religion, and states. Prima facie it appeared that there is a difference in expenditure decisions across them. What might be the reasons contributing to these? Do the people living in North India spend the same on HNF as compared to South India? Do the OBC's increase their expenditure on HNF in the same proportion as the Brahmins? Do the Hindu's and Muslim's record the same increase in their consumption of HNF's? Why not?

## 4. Research Method

Household data from IHDS contained recorded data of 41,554 households from 1503 villages and 971 urban neighborhoods across India. This data contained 924 variables. Out of these, we used 30 variables for our research. States were categorized in North, East, West, South, Central and North East.

North included states of Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Uttar Pradesh, Uttaranchal (presently Uttarakhand) South included states of Andhra Pradesh, Karnataka, Kerala, Pondicherry, Tamil Nadu. East included states of Bihar, Jharkhand, Orissa, Sikkim, West Bengal. West included states of Dadra & Nagar Haveli, Daman and Diu, Goa, Gujarat, Maharashtra. Central included states of Chhattisgarh and Madhya Pradesh. North East included the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura. The states were divided into these 6 zones so as to capture the vast geography of India in a condensed form.

Two new variables were created, 1) "Nutritious food" in which the expenditure on 6 highly nutritious food items (Pulses, Cereal Products, Meat, egg, milk and milk products) were taken and summed together. 2) PCCNF which recorded the per capita consumption on nutritious food by dividing Nutritious Food by the number of persons in that particular household. The remaining variables were changed so that it is more clearly understood.

Using data mining to predict the trends in the household data was an interesting idea. Data Mining was applied on this data set using SPSS Clementine 12.0. PCCNF was taken as the output variable and was treated with various individual input variables (religion, caste, ration card, no. of meals per day, state zone etc) and combination of input variables using C&R Tree. "The Classification and Regression (C&R) Tree node is a tree-based classification and prediction method. This method uses recursive partitioning to split the training records into segments with similar output field values. The C&R tree node starts by examining the input fields to find the best split, measured by the reduction in an impurity index that results from the split. The split defines two subgroups, each of which is subsequently split into two more subgroups, and so on, until one of the stopping criteria is triggered. All splits are binary (only two subgroups)." Clementine Help.

Later on, the per capita consumption of Nutritious food was categorized into 3. PCCNF in the range of INR

- [0-100): Low
- [100-200): Average
- >200: High

This is the discretisation of range variable. We categorize this as per our own discretion in order to find a better and clear picture of the results which is more clearer and has less of numeric values. On the discreet and categorized values, we use the C5.0 modelling and note the results. "The C5.0 node builds either a decision tree or a rule set. The model works by splitting the sample based on the field that provides the maximum information gain at each level. The target field must be categorical. Multiple splits into more than two subgroups are allowed." Clementine Help

### 5. Empirical Results Using C&R Tree

- **Across Caste**

The predicted (average) Per Capita Consumption of Nutritious Food of households across India in Rupees at 2005's current prices was INR 134.87. The caste was categorized into two nodes. The first node Brahmin, Others (32.48%) showed a predicted PCCNF of INR 178.20. Further sub dividing Brahmins (5.83%) had a predicted PCCNF of INR 190.74 while others (26.65%) consumed INR 175.38. Among the OBC, SC and ST, the OBC's (39.19%) showed a consumption of INR 121.19 followed by SCs (20.05%) at INR 109.89 and STs (8.28%) at INR 90.31 (Refer Fig 1)

- **Across Religion**

Across religion, the Sikh and Jain community 2.72% of the whole sample, had the maximum consumption on HNF predicted at INR 204.5. Next to them are Christians who were 3.32 % of the sample consumed INR 158.68. Hindus formed the major part of the sample (81.36 %) and spent INR 132.35 per capita on consumption of HNF, which is slightly below the national average. The tribal population representing only 1.03% of the sample showed the drastic fall in HNF consumption, thereby spending only INR 72.70

- **Across Regions/States**

Across regions, the households of North India spent on an average INR 187.65 per capita. We further sub divide North India and club Punjab & Haryana together and keep rest of the North Indian States together we notice an interesting result. Punjab and Haryana have a per capita consumption of HNF at INR 228.90. South Indian households have a per capita consumption of INR 124.02 while the West India has a predicted consumption of INR 119.53 . The Central and East Indian States show a PCCNF of INR 72.74 and INR 97.76 respectively. The North Eastern households, though 5% of the sample spent INR 148.35 which is above the national average of INR 134.88.

- **Across Income**

Consumption of HNF also shows high correlation with income. Majority of households had their annual income between INR 0 to INR 27553.96 (44.28 % of households). These low incomes were clearly reflected in the expenditure of HNF's where the households spent an average of INR 92.52 per capita per month. The households who with annual income between INR 27553.96 to INR 35834.67 (9.83 % of households) had a PCCNF of INR 117.57 which is still below the National Average. Households with annual income above INR 35834.67 to INR 47773.70 (10.3 %) spent near the national average. Their average PCCNF was 131.23. Thus, we see that 64.41 %, i.e., around 2/3<sup>rd</sup> Indian households consumed nutritious food below the national average. This suggests that National Average is affected by the extreme values of the high consumption of the higher income households. Households with higher income subsequently showed proportionately higher consumptions of HNF's. All households with income greater than 47773.70 had a predicted consumption of HNF more than the national average. The highest average consumption of INR 285.27 was shown by households with income greater than INR 237665. Though they were just 2.28% of the sample.

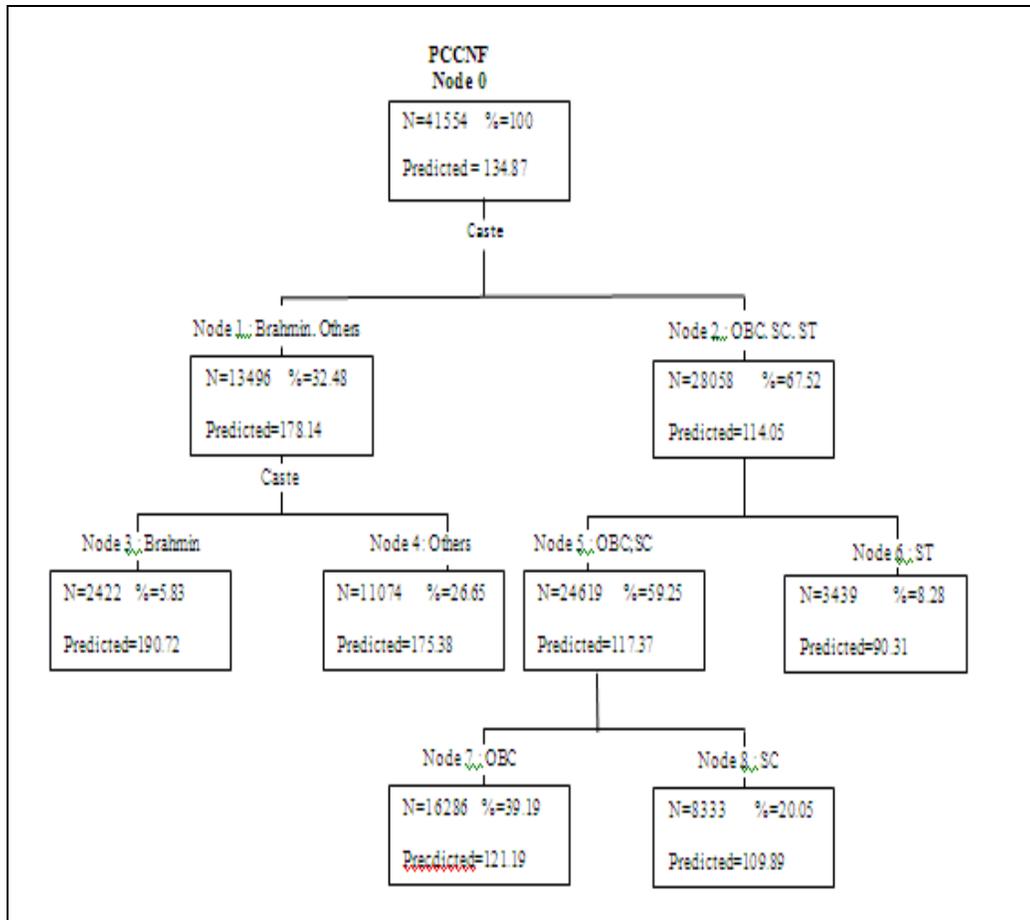


Figure 1: C&R Tree Input Variable: Caste; Output Variable: PCCNF

**Across Sources Of Income**

Comparing from the point of view of main income source of Indian households, agricultural and non agricultural labourers are the worse off in terms of consumption of HNF. Household with Agricultural labourers (13.60% of the total households) spent INR 80.36 on HNF while those with Non Agricultural labourers (17.58 %) spent INR 100.29 per capita. Artisans (5.96 %) spent on an average INR 125.27 while those involved in some type of cultivation (23.58%) spent INR 124.70. Households with other professions showed a consumption above the national predicted value of expenditure on HNF i.e. INR 134.88. Households involved in petty trade (4.53 %) spent INR 141.84. When the main income source was allied agriculture, business or some profession (7.78%) the expenditure on HNF per head was INR 172.99 whereas in case of Salary as the main source of income for the household (20.40 %) expenditure per head of HNF increased to INR 185.01. The highest consumption was shown by household whose main source of income was rental income from property or pension (3.93%). They consumed as high as INR 208.64 worth of HNF.

**Across Other Variables**

Applying the data mining techniques on other variables yielded many interesting results. A Variable POOR was assigned a value YES if the household was poor according to the 2005 poverty estimates which differed across states. Taking POOR as input variable when data mining was performed, we found that 19.70 % households which came in the category of poor; their average consumption of HNF was as low as INR 46.28. The households which were not poor (80.30 %) showed a higher average consumption of INR 156.61 . If the poor belonged to the ST community, their condition was all the more pathetic as they could consume only INR 29.80 worth of HNF's. The poor belonging to SCs and OBCs had a predicted average consumption of 47.37. Brahmins and Others of the poor category consumed better than the SCs and STs. Their consumption per capita was INR 59.68.

Mining with multiple input variables, some interesting results were noted. Agricultural labourers of the North India were the best in consumption, spending INR 123.54 in HNF while those of Central & East India were the worst, consuming only INR 45.65. Among the Brahmins, the North Indian Brahmins show the maximum consumption consuming HNF worth INR 225.20 while the Brahmins of central, east and west India, consumed only INR 151.5 . The OBC and STs of North India consumed the maximum HNF INR 163.53. Among the regions of higher ST population, interestingly, the states of North East performed better than all others consuming INR 153.82 worth of HNF. While the tribals of Central India were the worst

performers consuming only INR 36.60. Even though the agricultural labourers consumed the least, the very few Brahmin agricultural labourers had a higher consumption of more than INR 100. While agricultural labourers coming under ST category consumed the least, INR 63.16. Similar was the result for Non-Agricultural labourers.

## 6. Results Using The C5.0 Modelling

In the C5.0 modelling, we take the discreet PCCNF as the output variable and take multiple input variables, like caste, religion, income; state zones, ration card etc are taken. We note various results which are in resonance with the results obtained through C&R tree. The noted results are as follows:

- 57.29% of the households living in central, east, south and west India had low consumptions of HNFs.
- 38.96% of households of North East had low consumptions while same percentage of households had average consumption. Only 22.08% of North Eastern household had high consumptions of HNF. In north India almost equal percentages of population where in the Low, Average and High category
- 49.14% of Brahmins and Others in North India had High consumption while 32.76% of them had average consumption. This shows that North Indian Brahmins and Others are comparatively well off than OBC, SC, ST who are just 25.35% in High and 34.09% in Average category..
- The Sikh are the most well off communities with more than 40% of them showing High consumptions of HNFs. They are followed by Jain and Christians with 28.28% of them consuming High HNF's.
- Among all other religions, only around 20% of them show High consumptions of HNF while almost 50% of them are in the Low consumption category.
- 61.17 % Households across the country with annual income less than 47810 have Low consumptions of HNFs. While households above this income level only 25.24% have Low consumptions
- Among all income groups, the Brahmins and Others show high consumption. All other communities are far behind the average consumptions of Brahmins and others.

## 7. Conclusion

Disparity in income is clearly seen in the empirical results and categorized results when we look at it from the point of view of per capita consumption of nutritious food. Interpreting this consumption as Income, the Brahmins and Others across India are better off than all other communities while the ST community is the poorest. A large income gap is also seen between the Brahmins and STs. The Sikh and Jain are the higher income earning religious communities, so their consumption of HNF is also higher compared to all other religions. The households of North India are better off than all others; this might be due higher agricultural productivity and production & consumption of milk and milk products in states of Punjab, Haryana and western Uttar Pradesh.

PCCNF highly correlates with increase in Income. Increases in Consumption of highly nutritious food can also be observed as increase in real income. It is important to note that agricultural labourers are the poorest in consumption of nutritious food and thus income. One of the reasons for this can be the disguised unemployment in agriculture. Renting a property and a salaried job generates higher income and thus higher consumption. Thus, summing up, we may argue that disparity in consumption of nutritious food provides a better picture of the income disparity of Indian households. Highly Nutritious Foods are the food items which a household has to buy at market prices, thus its basket is suited for estimating the real income.

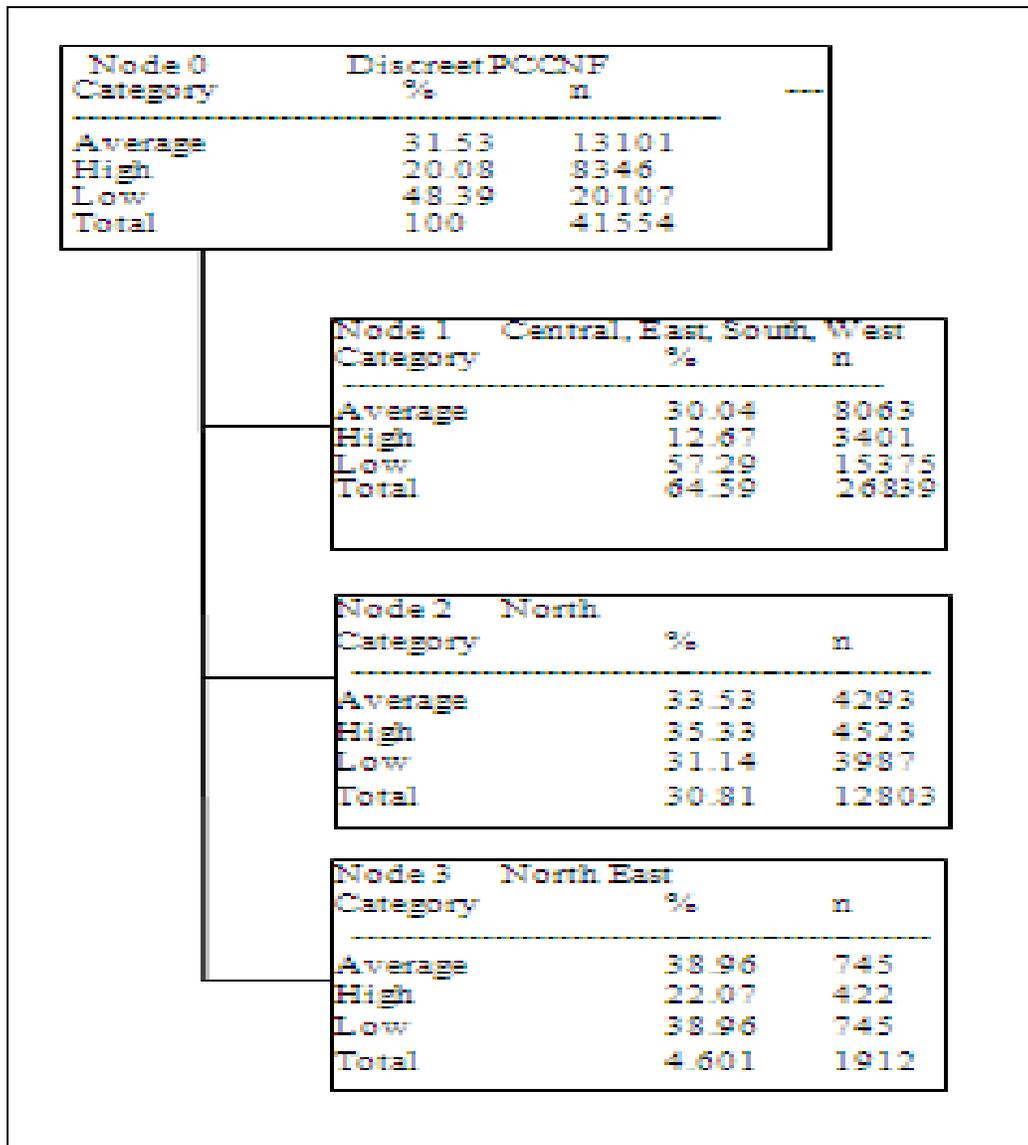


Figure 2: C5.0 Modelling  
 Input Variable: NEWS; Output Variable: Discreet PCCNF

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## Measuring Degree of Global Competitiveness: A Case on World Tea Industry

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### **Abstract:**

Globalization and competitiveness, compressed the world in a borderless society. Degree of competitiveness helps to examine the present status and future prospects of an industry. This article is an attempt to measure the extent of global competitiveness in

world tea industry. Roy (2006) the formula  $(1 - \sqrt{\sum M_i^2})$  for degree of competition is applied where  $M_i$  is the market share of each individual nation in global tea production,  $i$  ranging from 1 to  $k$ . For each year we can calculate one such measure, generating there by a time series data. Based on time series analysis one can indicate the past trend and future direction. The position of India has also been indicated along with top ten nations.

**Key words:** Global competitiveness, world tea production, market share, trend analysis, degree of competitiveness

### **1. Introduction**

Globalization is the word that has come to dominate the world since the nineties of the last century. It has brought in new opportunities to developing countries through greater access to developed country markets and technology transfer, hold out promise improved productivity and higher living standard. But globalization has also thrown up new challenges like growing inequality across and within nations, volatility in financial market and environmental deteriorations. Globalization and trade liberalization coupled with easy flow of information and advancement in communications technology have resulted in an unprecedented intensification of market competition worldwide. With this backdrop, Porter (1998) has commented that competitiveness has become a “central preoccupation of both developed and developing countries in an increasingly open and integrated world economy”. He stressed upon the nations, countries and firms to urgency of strengthening competence of handle the resultant threats. According to (Haider, 2007), meaning, implication, adaptation and achievement of competitiveness may vary from firm to firm, industry to industry and nation to nation across the world. According to Global Competitiveness Report 2010-2012, there are multiple challenges to the global economy and a continuing shift in the balance of economic activity away from advanced economies toward emerging markets. Policymakers are struggling to find ways to manage the present economic challenges and preparing their economies to perform well in an increasingly complex global landscape. Switzerland is the leading country and is followed by Singapore, Sweden, Finland, United States, Germany, Netherland, Denmark, Japan and United Kingdom. Japan remains the second-ranked Asian economy at 9th place, despite falling three places since last year.

According to the Global Competitive Index (GCI), India’s rank falls from (48th - 59th) position from the year 2007-2008 to 2012-13. GCI is constructed based on 12 sub measures of competitiveness. It provides with a comprehensive portray of the competitiveness landscape for countries around the world at all stages of development. The sub measures are institution, infrastructure, macroeconomic stability, health and primary education, higher education and training; goods market efficiency, labour market efficiency, financial market sophistication, technological readiness, market size, business sophistication and innovation.

In this article we have selected tea industry to analyze its global competitiveness.

Tea was discovered by one of Chinese emperor in 2737 B.C. He had a habit of drinking boil water. So, one day when he was drinking boil water in his garden, a tea leaves fell in to his cup. After drinking the boil water with the tea leaves, he found himself energetic. Then he gave ordered to plant more tea trees in his garden. And this tradition of drinking boil water with fresh tea leaves spread quickly in china. In 6th century AD Chinese called tea as “Kia”, then it changed in to “Cha”. When it arrived in the west, it becomes Tea, which is still the name for tea in many countries.

How tea is prepared also varies by market and region. The tea industry has a small number of products that compete with “cold and sweet” and “ready-to-drink” beverages. In the United States, companies offer bottled and canned iced tea, usually sweetened and flavored. In East Asia, both hot and cold tea is available from vending machines that mix a tea essence with water. In both cases, marketers are targeting young adults, many of whose parents do not drink infusions and who must be introduced to tea for the first time. Rising health consciousness is also conditioning the market for tea. Tea preparation involves boiling water and so purges pathogens normal to tap water in many countries, and antioxidants in tea (flavonoids) might play a role in cancer prevention. In addition, the recent “Rotterdam Study” found that drinking tea may reduce the risk of arteriosclerosis and another study by Boston University School of Medicine concluded that drinking up to four cups of black tea per day improved blood vessel function in those suffering from coronary artery disease

### *1.1. Global Tea Scenario*

Tea is the most popular beverage throughout the world. More than 30 countries are now involved in the production of tea. Among them India , China ,Indonesia ,Sri Lanka and Kenya are the five major player producing more than 75% of total world production and around 80% of global export. The estimated global tea production is around 3800 million kg and global consumption is around 3700 million kg. On average, human beings consume about 176 liters per year of purchased beverages; in the United States annual per capita consumption is climbing to 650 liters. Tea represents 21 percent of worldwide human consumption of purchased beverages. The remaining 78 percent consist of milk (20 percent), carbonated beverages (17 percent), beer (14 percent), and coffee (11 percent) with bottled water, juices, sports and energy drinks, wine, and spirits making up the balance. Tea being an agricultural product there is always fluctuation in its production.

Tea is the principal beverage in Asia, the Commonwealth of Independent States (CIS), the Middle East, North Africa, and is also drunk widely in developed British Commonwealth countries—Australia, New Zealand, the United Kingdom, and, to a lesser extent, Canada. Coffee is preferred in the United States, Western Europe, and Latin America. Teas and coffees in these markets vary widely in price and quality, with some used as a quick, inexpensive stimulus and others as premium brew for special occasions.

Across various countries the per capita consumption of tea is different. In Ireland it is more than 2 kg, around 1 kg in Sri Lanka and it is 800gm (approx.) in India. The per capita consumption in India is less but due to high population, the total consumption is largest. From year 1998 to 2007 the production of black tea declined but the production of green tea increased because of huge expansion in China because drinking green tea can reduce the risk of cancer.

### *1.2. India Tea Scenario*

In India the commercial cultivation of tea started in year 1839 in Assam then it was extended in to other parts of the country in 50s and 60s of the 19th century. Tea industry has a significant role in the economy of India. It employing more than 3.5 million people across the country. Indian tea industry produces 30% of world’s annual output. Domestic demand is estimated at over 850 million kgs in 2011. 85% of the country’s output consumed within the country. Tea is produced in 14 states in India ,among them Assam and west Bengal in north India and Tamil Nadu , Kerala, Karnataka in south India produce over 98% of total India’s tea production .

In India, plantations account for 0.8 per cent of the total cultivable land. They also contribute 5 per cent to the national income in agriculture. Besides they provide more employment per rupee of investment in the country than either agriculture or in industry. Plantation industry employs a large amount of labour force especially women workers which are highest compared to any industry. Moreover, this industry helps in the development of other industries. Among the different plantation crops, tea is considered to be the most important crop in our country. It is the second biggest foreign exchange earner and is exported to about 80 countries. It also contributes a sizeable amount to the national income. Moreover, it provides direct gainful employment to a large number of people and helps in providing indirect employment in various sectors like road construction, transportation, building of warehouses, manufacture of plywood tea chest, aluminium foil, tinsplate, metal fittings, paper, card board, fertilizers, insecticides, pesticides, coal, iron, steel, etc. Apart from its contribution to the economy of India, tea today provides to the common man a pleasant and stimulating non-alcoholic beverage.

## **2. The Objective of the Study**

The global picture of tea industry can help us to know the position of Indian tea industry with respect to its global competitors. The objective of this paper is therefore to measure the global competition among the tea producing countries from 2002 to 2011 and to know the position and performance of India on global platform. This will also help to analyze whether it maintains the same trend or not.

## **3. Methodology of the Study**

The methodology adopted for carrying out the present study divided in to broad headings like period of the study, scope of the study and techniques used for the study.

### 3.1. Period of the Study

The period from 2002- 2011 has been selected depending on the availability of secondary data, information.

### 3.2. Scope of the Study

This study will help students, researchers, economists and other company planner to carry out their research work. It will also help them to know about global competitiveness and to calculate global competitiveness in their respective field.

### 3.3. Techniques Used For Analysis

The analysis deals with descriptive analysis and statistical analysis. The statistical analysis is to find out the trend in degree of competition among the global competing countries in the production of tea. The corresponding hypothesis follows the null hypothesis  $H_0$  that there is no increase in the global competition in the production of tea against the alternative hypothesis  $H_a$  that there is increase or decrease in the same.

To find out the global competitiveness, we have calculate market share of each country every year. Then Roy (2006), the formula for degree of competition  $(1 - \sqrt{\sum M_i^2})$  applied. Where  $M_i$  is the market share of each country in global tea production.

We have taken the data from year 2002 to 2011 of top ten countries. They are China, India, Kenya, Sri Lanka, Indonesia, Turkey, Vietnam, Bangladesh, Malawi, Uganda and Tanzania, then we have proceeded by calculating their market share. Next calculated squares of these individual market shares for a particular year and then added those squares to get  $\sum m_i^2$  for that year. The entire process can be repeated for obtaining  $\sum m_i^2$  for all the years. Next, we have calculated the value of  $(1 - \sqrt{\sum m_i^2})$  to obtain the degree of competition for all the years. At last trend line is drawn by taking the competitiveness index of every year.

## 4. Descriptive Analysis

- **India:** The production of India increased from 848.2 M kgs. In 2002 to 988.33 M kgs in 2011 but the market share of India is decreasing. In 2002 it was 0.3111, but in 2011 it was 0.23.
- **China:** The production of China increased from 605.7 M kgs in 2002 to 1623.21 M kgs in 2011. The market share of China is in an increasing trend, from 0.2221 in 2002 to 0.378 in 2011.
- **Kenya:** Production of Kenya was 293.4 M kgs in 2002 and it increased to 377.91 M kgs in 2011 but the market share is decreasing.
- **Sri Lanka:** The production of Sri Lanka is increasing from 303.9 M kgs unit in 2002 to 328.63 M kgs in 2011 but its market share is decreasing.
- **Indonesia:** The production of Indonesia is in an increasing trend from 169.6 M kg to 178 M kgs from 2002 to 2011 but the market share is decreasing from 0.0622 to 0.041.
- **Turkey:** The production of Turkey is decreasing from 149.3 M kgs to 145 M kgs in 2002 to 2011. The market share is also decreasing.
- **Vietnam:** The production of Vietnam is increasing from 83.7 M kgs in 2002 to 119.65 M kgs in 2011 but the market share is decreasing.
- **Bangladesh:** The production of Bangladesh is increasing from 55.8 M kgs in 2002 to 59.32 M kgs in 2011. Market share is also decreasing from 0.025 to 0.014.
- **Malawi:** The production unit of Malawi is increasing from 40.8 M kgs in 2002 to 47.06 in 2011 but the market share is decreasing from 0.015 to 0.011.
- **Uganda and Tanzania:** The production of both Uganda and Tanzania are increasing from 2002 to 2011. There is a little increase in market share of Uganda from 2002 to 2011 but the market share of Tanzania is decreasing.

Production in M Kgms	Year	Rank	Year	Rank	Year	Rank	Year	Rank	Year	Rank	Year	Rank	Year	Rank	Year	Rank	Year	Rank	Year	Rank
COUNTRY	2002		2003		2004		2005		2006		2007		2008		2009		2010		2011	
China	605.7	2	631	2	854	2	956.3	1	1047.4	1	1140	1	1257.6	1	1358	1	1475.06	1	1623.21	1
India	848.2	1	839.5	1	895.9	1	919.4	2	954.3	2	986	2	980.82	2	979	2	966.4	2	988.33	2
Kenya	293.4	4	295.9	4	328.8	3	332.7	3	313	3	369.61	3	345.82	3	314	3	399.01	3	377.91	3
Sri Lanka	303.9	3	304.8	3	309.1	4	317.2	4	312	4	304.61	4	318.7	4	289.78	4	331.43	4	328.63	4
Indonesia	169.6	5	163	5	139	6	165.9	6	187.9	6	148.27	6	166.38	5	175	5	170	5	178	5
Turkey	149.3	6	155	6	205	5	205.6	5	200.1	5	178	5	155	6	153	6	148	6	145	6
Vietnam	83.7	7	90	7	93.9	7	104	7	133	7	137.25	7	137.5	7	136.48	7	129.2	7	119.65	7
Bangladesh	55.8	8	88.6	8	55.6	8	56	8	53.4	8	58.42	8	58.66	8	60	8	59.27	8	59.32	8
Malawi	40.8	9	41.7	9	50.1	9	46.9	9	45	9	48.14	9	41.64	9	52.56	9	51.59	9	47.06	9
Uganda	34.5	10	36.5	10	37	10	37.7	10	36.7	10	44.91	10	42.75	10	50.58	10	59.14	10	54.18	10
Tanzania	27.2	11	29.5	11	30.7	11	30.4	11	31.4	11	34.86	11	31.61	11	32.69	11	31.65	11	32.78	11
Others	114.7		115.1		120.8		118.9		113.4		345.58		328.31		342.65		349.45		345.15	
World	2726.8		2790.6		3119.9		3291		3427.6		3795.65		3864.79		3943.74		4170.2		4299.22	

Table 1: Production of Tea from Year 2002 to 2011-Unit-In M Kgs.

Source: Tea Board

COUNTRY	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012									
	Mi2002	M20022	M2003	M20032	Mi2004	M20042	Mi2005	M20052	Mi2006	M20062	Mi2007	M20072	Mi2008	M20082	Mi2009	M20092	Mi2010	M20102	Mi2011	M20112
China	0.22	0.049	0.226	0.051	0.274	0.075	0.290	0.084	0.310	0.096	0.300	0.090	0.325	0.106	0.344	0.118	0.350	0.123	0.378	0.143
India	0.311	0.097	0.301	0.091	0.287	0.082	0.280	0.078	0.280	0.078	0.260	0.068	0.254	0.065	0.248	0.062	0.230	0.053	0.230	0.053
Kenya	0.108	0.012	0.106	0.011	0.105	0.011	0.100	0.010	0.090	0.008	0.097	0.009	0.089	0.008	0.080	0.006	0.100	0.010	0.088	0.008
Sri Lanka	0.111	0.012	0.109	0.012	0.109	0.010	0.100	0.010	0.090	0.008	0.080	0.006	0.082	0.007	0.073	0.005	0.080	0.006	0.076	0.006
Indonesia	0.062	0.004	0.058	0.003	0.045	0.002	0.050	0.003	0.050	0.003	0.039	0.002	0.043	0.002	0.044	0.002	0.040	0.002	0.041	0.002
Turkey	0.055	0.003	0.056	0.003	0.066	0.004	0.060	0.004	0.060	0.004	0.047	0.002	0.040	0.002	0.039	0.002	0.040	0.002	0.034	0.001
Vietnam	0.031	0.001	0.032	0.001	0.030	0.001	0.030	0.001	0.040	0.002	0.036	0.001	0.036	0.001	0.035	0.001	0.030	0.001	0.028	0.001
Bangladesh	0.021	0.000	0.032	0.001	0.018	0.000	0.020	0.000	0.020	0.000	0.015	0.000	0.015	0.000	0.015	0.000	0.010	0.000	0.014	0.000
Malawi	0.015	0.000	0.015	0.000	0.016	0.000	0.010	0.000	0.010	0.000	0.013	0.000	0.011	0.000	0.013	0.000	0.010	0.000	0.011	0.000
Uganda	0.013	0.000	0.013	0.000	0.012	0.000	0.010	0.000	0.010	0.000	0.012	0.000	0.012	0.000	0.013	0.000	0.010	0.000	0.013	0.000
Tanzania	0.010	0.000	0.011	0.000	0.010	0.000	0.010	0.000	0.010	0.000	0.009	0.000	0.008	0.000	0.008	0.000	0.010	0.000	0.007	0.000
Others	0.042	0.002	0.041	0.002	0.039	0.002	0.030	0.001	0.030	0.001	0.029	0.001	0.028	0.001	0.028	0.001	0.028	0.001	0.028	0.001
World	1	0.575	1	0.581	1	0.5665	1	0.5629	1	0.5528	1	0.567	1	0.5558	1	0.5476	1	0.548	1	0.5311

Table 2: Showing the Market Share and Square Of Market Share

Year	Degree of Global Competitiveness of Tea production
	$1 - \sqrt{\sum M_i^2}$
2002	0.575
2003	0.581
2004	0.5665
2005	0.5629
2006	0.5528
2007	0.567
2008	0.5558
2009	0.5476
2010	0.548
2011	0.5311

Table 3: The Degree of Global Competitiveness ( $1 - \sqrt{\sum M_i^2}$ ), In The Global Tea Production from Year 2002 To 2011

The above figures is plotted below and shown in the graph 1

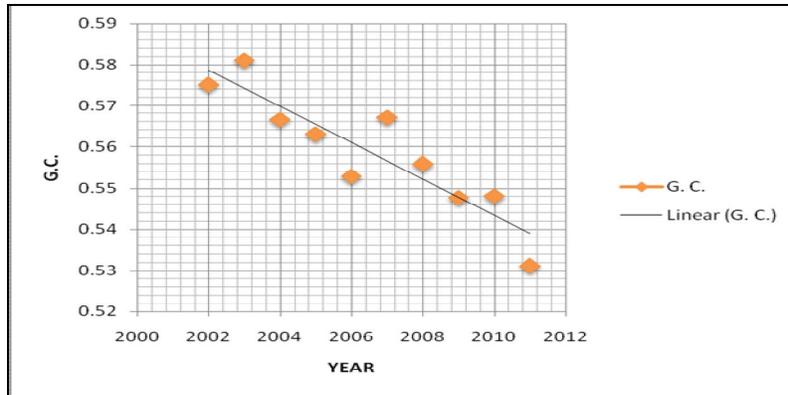


Figure 1: Graph for the Degree of Global Competition Along With the Trend Line

**5. Statistical Analysis**

The original time series data set on global tea production have used to study the time series analysis from 2002 to 2011. In Table 2 we have calculated the  $M_i^2$  where  $i$  varies from 2002 to 2011. To examine the trend of competition over the years for detecting any change in the degree of competition in global tea production, we would like to plot the values of  $(1-\sqrt{\sum M_i^2})$  over the years, which can be observed in Table 3.

In view of Figure 1, we propose to go for linear regression analysis. We shall consider the hypothesis  $H_0$  as null hypothesis that there is no change in the degree of global competition in steel production over the years against  $H_a$  as alternative hypothesis that there is an increase or decrease in the same over the years.

Let the linear trend equation of Global Competitiveness of tea producing countries be represented by

$$G_t = a + b t + \epsilon_t \tag{1}$$

Where  $G_t$  is the global competitiveness during the period  $t$ ,  $a$  and  $b$  are the regression parameters,  $t$  is the time variable, and  $\epsilon_t$  is the error term. Using the least square method one can estimate  $a$  and  $b$  using time series data from Table 3.

The corresponding analysis is presented below

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.906	.822	.799	.007

Table 4

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.002	1	.002	36.858	.000
Residual	.000	8	.000		
Total	.002	9			

Table 5

Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Case Sequence	-.004	.001	-.906	-6.071	.000
(Constant)	.583	.005		129.348	.000

Table 6

The estimated value of  $a$  and  $b$  are  $\hat{a}$  and  $\hat{b}$ . Here  $\hat{a}$  is .583 and  $\hat{b}$  is -.004. Therefore the estimated regression line observed is

$$G_t = .583 - .004 t + \varepsilon_t, \quad (2)$$

To examine the significance of b value, the regression coefficient of this linear regression curve, we like to test the null hypothesis,  $h_0: b = 0$  against the alternative hypothesis that b is greater or lesser than zero, i.e.  $h_a: b > 0$  or  $h_a: b < 0$ . The observed value of t is  $-6.071$ , with a tail probability of .000, which is less than .05. Hence rejecting the null hypothesis at 5% level of significance i.e. the global competitiveness of world tea production is “significantly decreasing over time” as the coefficient of time is negative. The multiple correlation on, i.e. r value, is 0.906 which is also on the higher side. The corresponding analysis of variance table provides with f ratio as 36.858 for which the upper tail probability is 0.000, which is less than 5% level of significance. So, we conclude that, the linearly decreasing trend equation is a good fit for the said problem.

## 6. Conclusion

Thus, we finally conclude that the global competition for tea production is decreasing over the years, whereas, the market share of India is also decreasing. This indicates an threat for Indian Tea Estates.

Among the top ten producing countries of global tea production the market shares of only China is favorable compared to other nine countries. India is one of those countries whose market share is decreasing. The performance of India is also is not upto the mark in the years 2002, 2003, and in 2004.

Though India in 2005, as a part of turnaround strategy has started promoting and re-positioning the product by promoting “Made In India” tag in the world tea market as a part of initiatives to augment the Indian tea exports. Chai Piyo, Mast Jiyo (drink tea, enjoy life) is the new USP to hold back the declining home consumption highlighting tea as healthy refreshing drink. Unlike now, a decade back tea exports from India were doing fairly well in the world tea market, with India as the largest producer and exporter of tea. But the last two years output declined drastically, and the exports dropped. Indeed, the situation is appalling.

While the world tea output & trade has grown multifold, the Indian production and exports have been experiencing the spectral downfall. There have been falling prices, reduced exports and sluggish consumption growth at home. Long gestation period and ROI spread over a time of minimum 5 years, high labour costs accounting for nearly 60% of tea production and, climatic changes critically affecting demand-supply imbalances, have led to these causes.

The problem just does not end here. Surging competition from countries like Kenya, Indonesia, Vietnam & Turkey is also on all time high, which has further weakened Indian exports without affecting much the world tea market, or missing out on India as a leading source for quality tea. Primarily, the cause which is making dent in Rs. 10,000 crore-tea industry of India has deep roots in its micro-environment.

So, overall it is a great threat to Indian tea industry as China is doing well and degree of competition is decreasing over the years. It is now the responsibility of government to take more steps to increase the production.

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## Shariah Investment in India: An Unexplored Opportunity

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### **Abstract:**

*The Religious set of banking, especially Islamic Banking and Investment was nonexistent around 30 years back. But in 2006, Islamic financial institutions' (IFIs) assets worldwide were estimated at more than \$300 billion, with another \$400 billion in financial investments, according to a study by accounting firm KPMG. Which is considerable and the growth momentum noticed by KPMG is also substantial.*

*According to the study conducted by Consulting firm McKinsey & Co the current growth rate of Islamic Banking & Investment is 15% annually and in coming 5 years this rate is going to be 20%.*

*Islamic finance is built on the premise that while “commerce had always been central to Islamic tradition, profits from pure finance [are] viewed with suspicion. Profits from commerce are fundamentally different from those generated by money-lending.”*

*Islam prohibits riba (“extra” or interest) and usury (excessive interest), because fixed, pre-determined interest-based lending casts an inherent risk of the lender exploiting the borrower. Islamic banking differs in the relationships between borrower and lender, favouring profit-and-loss sharing or partnership finance.*

*Most large western financial institutions have Islamic subsidiaries or at least Islamic products. In the US, a Dow Jones Islamic market index (DJIM) was launched in 1999 to benchmark Shariah-compliant portfolios, even employing a board of Shariah scholars.*

*Lately though the formal introduction in Banking is delayed jointly by RBI and SEBI, because of complex methods of operation.*

**Key words:** Islamic Banking, Ethical Fund, Shariah Law, BSE TASI Shariah, CNX NIFTY Shariah

### **1. Review of Literature**

Some work is being done in this regard however the available credible data set is much more prominent now. [http://crisil.com/crisil-young-thought-leader-2008/dissertations/Dissertation\\_SoumikMajumdar.pdf](http://crisil.com/crisil-young-thought-leader-2008/dissertations/Dissertation_SoumikMajumdar.pdf)

Though in the above mentioned paper, it is documented that Taurus Parsoli Ethical Fund (launched on March 20<sup>th</sup> 2009)<sup>1</sup> was the Maiden Shariah fund in India, but it is observed from the available data that Benchmark Shariah Bees<sup>2</sup> were already existent (launched on 5<sup>th</sup> Mar 2009) when Taurus launched their fund. TATA Ethical Fund was launched on Sept 5, 2011 as they repositioned their TATA Select Equity Fund.<sup>3</sup>

### **2. Research Methodology**

With the help of existing research papers and industrial data from credible sources, an attempt has been emphasized on the growth of the Shariah Investment products in India. Apart from being a strict religious method, it has been also observed that the risk appetites of such investment vehicles are different than the common western investment vehicles.

<sup>1</sup> <http://www.global-islamic-finance.com/2008/08/as-islamic-finance-booms-globally-egypt.html>

<sup>2</sup> [http://www.moneycontrol.com/india/mutualfunds/mfinfo/investment\\_info/MCM049](http://www.moneycontrol.com/india/mutualfunds/mfinfo/investment_info/MCM049)

<sup>3</sup> [http://www.moneycontrol.com/india/mutualfunds/mfinfo/investment\\_info/MBM025](http://www.moneycontrol.com/india/mutualfunds/mfinfo/investment_info/MBM025)

<sup>4</sup> [http://www.moneycontrol.com/india/mutualfunds/mfinfo/investment\\_info/MTA010](http://www.moneycontrol.com/india/mutualfunds/mfinfo/investment_info/MTA010)

Study period is from 1996 to 2012. Country and Capital Market under consideration is of India. Lot of data is available though the sources and the data interpretation hold the key over here.

### 3. Study

Shariah Law recommends two types of screening.

#### 3.1. Sector Based Screening

Business activities related to the following are excluded:-

- Pork
- Alcohol
- Gambling
- Financials
- Advertising and Media (newspapers are allowed, sub-industries are analyzed individually)
- Pornography
- Tobacco
- Trading of gold and silver as cash on deferred basis
- During the selection process, each company's audited annual report is reviewed to
- Ensure that the company is not involved in any non-Shariah compliant activities
- Companies that are found to be non-compliant are screened out

#### 3.2. Accounting Based Screening

Companies left after passing through sector based screen are then examined for compliance in financial ratios as certain ratios may violate compliance measurements.

The three areas of focus are: leverage, cash and the share of revenues derived from non-compliant activities. All of these are subject to evaluation on an ongoing basis

#### 3.3. Leverage Compliance

For inclusion in the S&P CNX Nifty Shariah Index compliance is measured as:

Debt / Market value of equity (12 month average) < 33 %<sup>i</sup>

Now let's see the evolution of Shariah Investment in India

Action	Year
Action Year Establishment of Anand Sinha Committee under the Reserve Bank of India for studying Islamic Financial Products.	2005
Raghuram Rajan Committee recommends Islamic banking for financial inclusion of Muslim community in India.	2008
Government of India calls for bid in connection with reconstruction of National Minority Development Finance Corporation (NMDFC) on Shariah lines.	2008
SEBI permits India's first Shariah tolerant Mutual Fund, advised by TESIS. 2009 SEBI permits India's first Shariah tolerant Venture Capital Fund. 2009	2009
SEBI permits India's first Shariah tolerant Venture Capital Fund.	2009
GIC (Re), a government of India owned company, appoints TESIS for Shariah advisory	2009
Government of the state of Kerala appoints a consulting firm to seek advice on starting an Islamic NBFC	2009

Table 1

It was observed that 61% of the stocks that are listed in India are Shariah compliant, in comparison with 57% in Malaysia, 51% in Pakistan, and a mere 6% in Bahrain. 283 out of 500 stocks of BSE 500 are Shariah compliant. 39 out of 50 stocks of Nifty are Shariah compliant & 23 out of 30 stocks of Sensex are Shariah compliant.<sup>4</sup>

<sup>5</sup> [http://crisil.com/crisil-young-thought-leader-2008/dissertations/Dissertation\\_SoumikMajumdar.pdf](http://crisil.com/crisil-young-thought-leader-2008/dissertations/Dissertation_SoumikMajumdar.pdf)

So, Indian Indexes are more Shariah Compliant than its peers. Also India is the only Country with maximum Shariah compliant stocks among the BRIC countries.

These are attractions which could stimulate global Shariah giants to invest in Indian markets. One surprising fact came out during the research that Shariah Funds grow higher in a same set of macroeconomic & taxation environment than the normal Index.

BSE Shariah 50 has grown from 515.85 in 2008 to 1139.1 in 2012 (121% growth). This growth is significant compared to the growth (78%) in flagship Index Sensex. Sensex from 9647.31 in 2008 has reached 17197.93 in 2012.<sup>5</sup>

These all may be the reason that on September 5<sup>th</sup> 2011, TATA AMC has repositioned their Select Equity as TATA Ethical Fund following the Shariah lines of investment.

Tata Group's investment unit is seeking to attract about \$100 million within three years to India's first Shariah-compliant fund aimed at global investors, targeting equities in a country that lacks regulations for establishing an Islamic debt market.<sup>6</sup>

On 11<sup>th</sup> November 2010, Reliance AMC also came up with their Reliance India Shariah Growth Fund.<sup>7</sup>

Two Life Insurance Companies who use Shariah Compliant stocks, Bajaj Alliance & TATA AIG has generated higher returns than a host of traditional funds.<sup>8</sup>

But despite such silver linings the AUM (Asset under Management) data speaks of a completely different story. Out of the three funds in the said space in India Goldman Sachs Benchmark Shariah suffered a downfall of AUM from .25 Cr to 87 Lacs in 3 years (2009-2012). Taurus has grown from 2.48 Cr to 26.7 Cr 2009 to 2012) & TATA has grown from 103 Cr to 111 Cr (2011-2012).<sup>9</sup> The total Asset under management by Indian Mutual Funds hover around 6 Lack Crores of INR. So, It is been observed here that the allocation to Shariah compliant funds are so negligible.<sup>10</sup>

That clearly indicates that despite showing substantial outperformance these set of funds are out of favour. In fact Taurus Ethical Fund has generated 28% Vs 15% of its benchmark S&P CNX Shariah 500.

There are three Indices present in INDIA as of now. First one is S&P CNX Shariah 500 and the second is BSE Tasis Shariah 500, the third one is Nifty Shariah.

Returns	BSE Tasis Shariah	BSE 500	Sensex	Nifty Shariah	S&P CNX Shariah
YTD	-6.48%	-7.05%	-5.43%	-6.43%	-6.98%
1 Year	9.61%	7.48%	10.94%	5.43%	5.12%
2Year	117.79%	111.07%	100.29%	79.33%	93.43%
3 Year	48.58%	20.79%	24.29%	10.43%	13.92%
Since Inception	17.07%	-14.13%	-4.21%	-13.37%	-15.50%

Table 2

(Data Source Is BSEINDIA & NSEINDIA)

#### 4. Analysis & Findings

The researcher observed that although the Shariah funds have been launched with the aim of targeting a particular community, yet the fund houses have not been very successful in their endeavor.

The researcher observed that investors who want to take an exposure to a socially responsible fund can consider investing into this category. These funds take a lot of defensive calls that can be seen from their exposure into the Pharma space.

Also, it has been noticed that these funds are Bullish in Infrastructure space. Pharma being a stable sector and Infrastructure being a high growth area, they complement each other very well. Also, they tend to focus on OIL & Gas in a big way apart from Technology. Since, India has always a gap between demands & supply in OIL & Gas it enables space for growth. The Shariah compliant funds have outperformed, BSE-30, NSE-50, S&P CNX Shariah 500 on a consistent basis in last 3 years. The difference is being created

<sup>6</sup> <http://beta.bseindia.com/indices/IndexArchiveData.aspx?expandable=3>

<sup>7</sup> <http://www.financialexpress.com/news/tatas-shariah-fund-targets-100-m-from-gulf-in-3-yrs/706873/>

<sup>8</sup> <http://www.bloomberg.com/quote/RISGFIN:MP>

<sup>9</sup> [http://articles.economicstimes.indiatimes.com/2010-03-11/news/28416924\\_1\\_shariah-taqwaa-advisory-nifty-index-fund](http://articles.economicstimes.indiatimes.com/2010-03-11/news/28416924_1_shariah-taqwaa-advisory-nifty-index-fund)

<sup>10</sup> [http://www.moneycontrol.com/news/mf-experts/shariah-funds-will-they-riseshine\\_698506.html](http://www.moneycontrol.com/news/mf-experts/shariah-funds-will-they-riseshine_698506.html)

<sup>11</sup> <http://businesstoday.intoday.in/story/mutual-fund-industry-losing-investors/1/24486.html>

despite the economic, political, and Taxation environment being the same for Shariah compliant set of stocks and the entire universe of stocks.

So, indirectly it can be stated by the study that Shariah compliant set of stocks are having a better risk return relationship than the rest of the universe. In fact the shallow volume of the Indian Shariah funds should have put additional pressure on the fund managers to go for bulk deals and maintain redemption pressure. But in the study the significant outperformance has made a statement in itself that with a steady fund flow in these sets of funds even more prominent outperformance could be seen.

One interesting finding came out of this study by the researcher is despite following the same methods of selecting stocks for an Index generation & maintenance, the returns across the Shariah Indexes (S&P CNX Shariah, Nifty Shariah & BSE TASI Shariah) in India are substantially different. The study suggests that there is a further scope of research.

## 5. Conclusion & Recommendation

The current allocation to Shariah compliant fund may be miniscule, but the outperformance is visible in the study. The highest number of Shariah compliant stocks is in Indian Indexes, compared to any other Islamic nations.

Again India being a part of BRIC is considered as one of the favoured destinations among the Foreign Institutional Investors (FII). So, technically speaking it can be concluded that Shariah in India is in its infancy, but with a promise of a glorious future ahead. It is recommended by a researcher that as an investor one could passively invest in the BSE TASI Shariah 500 index, so, an ETF tracking the index is recommended. Here the researcher wants to inform that Benchmark Goldman Sachs Shariah ETF is tracking the other Index, which is S&P CNX Shariah 500.

Investor awareness is recommended by the researcher. Though it may be a certain religious fund, but can be a part of any portfolio, as a risk adjusted investment vehicle. When Systematic Investment Plan started it was unknown to a common retail Indian investor, but, now after 15 years later the story is completely different.

Similarly with Shariah compliant stocks and funds a dedicated set of customer awareness initiative is recommended.

This study does aim to highlight Shariah compliant investments as an asset class, solely from a returns and coverage point of view without any geo-political or religious comment.

## 6. Limitations of the Study

This study is carried out within the economic domain of the Union of India. Only two indices are compared with the existing Shariah Indices in a time frame of 3 Years. Since, it is a new walk of study, so, data availability is limited. The study also does not intend to focus on the detailed sector specific study across varied sectors. This study is limited to existing Shariah Models of Index. Focussed group study of Islamic investors could bring a lot of primary data (which was not within the boundary of this study).

## 7. Scope for Further Research

Scope of further study is huge as the three dimensional analysis can be carried out. First being the time span, second being the sector analysis and third being comparing with more non Shariah Indices. A new model or Index with a new focus can be constructed.

The % holding of stocks within these Shariah Indices are different, and that leads to the outperformance. Identification of that could open floodgates of Research ideas. TASI, Mumbai are currently undergoing a lot of similar kind of studies.

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## 9. Teaching Notes

- Understanding the basis of Islamic Investment
- Impact of "Interest Factor" in Islamic Investment
- To know the forbidden sectors for investment in the view of Islamic Law
- To understand the choice difference within Shariah Indices
- To notice the GAP in outperformance among Shariah Indices, despite the same LAW governing them all

## 10. Key Take Away

Being in such a diverse Country like India, different methods of Investments are available. But even within the similar set, governed by the similar pattern of rule the outcome could be completely different. Purely from a Investment perspective also, people can take

part in Shariah Funds, even being non-Muslims. Here this method is working as a Hedge against the possible Capital Market volatility.

**11. Identification Of Intended Course**

Finance, Behavioural Finance, Wealth Management, Portfolio Planning

**12. Suggested Student Assignment**

- To study the Correlation between different Shariah based Indices.
- To identify the % holding difference in Stocks within those Shariah based Indices, that eventually leads the Indices to Outperformance.

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<sup>ii</sup> (Source is All Bees presentation from Goldman Sachs<sup>ii</sup>).

<sup>ii</sup> <http://www.tasis.co.in/>

<sup>ii</sup> Links are provided as footnotes



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## Digital Receipts: A Viable Replacement For The Printed Receipts on Thermal Papers

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### **Abstract:**

*The business done with help of Information Technology helps reducing manual work and gives high returns. Here we discuss about the prevailing billing system and how to incorporate the Digital Receipt system in the present scenario. We here discuss four specific ways to implement digital receipts. The Bluetooth, available in most mobile phones and customer gets receipts on the spot. The SMS/MMS service can be used to deliver the receipt in the SMS format of in image type via MMS. The E-mail could be sent to the customers Id with the receipt attached in PDF or image format. The receipt in any format could also be shared over the cloud. These ways to implement the digitalization are discussed in the sections later in detail. The main advantage of the digital receipts is to reduce the use of Paper in this day by day degrading environment. Also this reduces the regular cost of paper rolls involved in billing for the company. The customers get a safe and long lasting receipt. Advantages of implementation of digital receipts have also been mentioned of in the sections later.*

**Key words:** digital, billing, receipt making, Bluetooth, Cloud Computing, SMS, MMS

### **1. Introduction**

The world is made such that when we buy some goods/products/services we always expect a proof of purchase. The proof of purchase, the Receipt is a very useful piece of paper that serves many purposes in life. The daily cash transfer for the buyer, the sales tracking for the seller and after sales service for the product. The world is moving fast towards the globalization, urbanization, so is towards the new and modern ways of Billing and accounting in Businesses. This paper describes the new way of Receipt generation, a change in the long followed printed receipts. The most common way of receipt is a Cash memo, made in hand, authorized by the owner. Through the advancements in technology, and its use in business, the new way followed is Printed receipt. Among printed receipts we here would like to take into consideration, the ones on the Rolls (any

paper roll like Thermal rolls[1] used widely today). These rolls are used in cash registers, adding machines, ATM machines etc. Here we'll talk about the rolls used for Cash Registers(billing) [2].The cash registers now are the modern day cash registers that use a Thermal Paper (some use normal paper rolls). Estimating the total paper usage for the Receipt purpose is at high cost to the environment. Here we talk about the alternative receipt making system.

As we go to a Super Store (or nowadays even the local shops in metros) the products we buy are billed through the cash registers and the receipt we get is not of use for many of us customers considering the Cost of it to the Environment. And if we do consider that it is of importance to the customer, then it is a difficult task to keep the receipt safe for a long period of time. The Alternative method of providing receipt we are to talk about is the Digital Receipt making.

There are a few different ways of implementing this system into the prevailing Cash register system. These are discussed in section II and its subsections .The section III talks of how to go about implementing digital receipts. And the section IV is about the advantages of the Digital receipt considering all the aspects of Business Studies and Information Technology. Table 1 in section V discusses comparatively the different techniques of implementing Digital receipts. Finally we conclude the paper in section VI.

### **2. Implementation**

The cash registers are made such that they keep record of the products in the store and the products are bar coded. The customer selects various products, there barcode is read on the product and billed. The bill is then printed on the paper roll. Instead of the print we suggest the Image of the bill be created and provided to the customer through any of the four under mentioned techniques.

Considering the Mobile phones, a device that's become part and parcel of the life of people nowadays and so will the customer at any shop/store shall have his/her mobile phone with himself/herself. Depending on the various functionality variations we have many ways to deliver the receipt to the customer.

### *2.1. Via Bluetooth*

The Bluetooth is found in any Smartphone (common like sunglasses in present world) or any normal Mobile phone [3]. The bill generated could be generated in the form of Mobile phone compatible image. The cash registers in the new modern world with increasing number of functionalities can easily be provided with Bluetooth on it. The customer giving order is very normal to carry a mobile phone that includes the Bluetooth functionality very well available in it. Upon billing the customer shall just provide with his Bluetooth device's (mobile) name so that the bill's image could be sent to the customer's device. The very easy and convenient method provides the customer with the long lasting format of receipt. This method doesn't involve much of cost as it would only require a Bluetooth functionality to be added to the cash registers and a program to make image of any receipt that's all.

### *2.2. Via SMS/MMS*

There is another method that can act as a viable medium of delivering the receipts. Almost all the mobile models support the images (jpg etc.). If the customer agrees to use the SMS/MMS option he shall provide the Cell Number on which he is to get the receipt. As image included in the message makes it a MMS, and in most mobile phones, MMS service is blocked by default, we need to either ask the customer to either start his MMS service or choose other option. Though customers can receive many of the general receipts in the form of SMS (Intimation of order status is nowadays made also of and total bill amount etc.), like the one step towards making Ticketing completely E based, they've brought about changes in their Ticket checking rules and successfully incorporated the E-Ticketing saving 8 lakh pages a day [4]. The saving of paper could be unimaginable if the superstore chains implement the digital receipt system.

### *2.3. Via Email*

The customer can also be provided with the option of receiving the receipt on his/her E-mail Id. The option of E-mail is very much viable and is used by the online billers and online service providers. In the today's world full of Internet six people on ten people in cities have at least an e-mail id. So if the customer feels comfortable with the option he/she shall receive their receipt through e-mail. This option only needs an E-mail server to be set up for the store so as to send auto generated e-mails. This option could be set a compulsory option and any one of the other should also be chosen as email is safely kept on the internet as long as the account's owner wishes to keep it. So the receipt will be very safely kept and that to at very minimum cost.

### *2.4. Via Cloud*

The fast growing use of the cloud in today's world has led to shift to various services to be on cloud, and also Smartphone users, more advanced computer users have also started using the Cloud Services to a great extent [5]. We don't doubt that in the coming world the cloud would be the next level of development and most of the services shall be provided and used on cloud. Taking into consideration this widespread use of the cloud and ever increasing need and use of it, we here also have an easy way to provide the customers with the digital receipt of their products/services bought. The customer upon billing out of many options can choose the Receipt via Cloud option where he just needs to provide his username if the vendor and the customer share the same cloud provider, else the e-mail id through which the digital copy of the receipt shall be shared with that email-id provided.

The cost involved in making this option working is that of the space on the cloud that could be very much feasible in the business as many business firms have already started use of the cloud on large scale.

## **3. How To Implement?**

At the billing counter the cashier upon billing all the products, shall make one click and all the options may appear on screen. The customer can choose the option that is best for him (among the one enlisted above) and should provide the cashier with the necessary details required. Upon which the customer shall be delivered his Digital Receipt instead of the Printed paper, which might be of no use for the customer in the printed format. The format of the receipt could be anything, a PDF files, an image etc. The format should be such that it could be unaltered by the customer by any means and remains a viable proof of purchase. Policy of sales and the service shall be made such that the customers don't face any problems regarding the receipts in future. A simple implementation is represented in the figure 1 below.

## **4. Advantages of Digital Receipts**

The system of Digital Billing if bought into practice shall have considerable advantages:

- The Environmental impact: if the method of billing is made digital, then the huge amount of paper would be saved. As usually the Thermal rolls are used nowadays and these rolls are not made from the recycled paper and are not reusable too. So, if we replace the paper rolls with the above discussed receipts' system we would be able to save a large amount of trees. It shall help the environment.

- Long life: From the customer point of view, the very much important aim towards the receipt is that, the receipt be kept safe and for long. One maintains a file/collection of all the bills and receipt for future presentation or so. So if kept digitally the receipt are much safer and long living than the usual printed ones.
- For business firms: The firms shall have no problem regarding the digitalization of the receipts. As the work goes on with the printed ones, so does with the digital ones. No high cost investment required. Beneficial and safe for both the customer and the firm too.
- Cost effective: Making the digitalization of the receipts possible is not a very cumbersome task. It reduces the cost of paper rolls and making these various methods of digital billing are almost one time investment only.

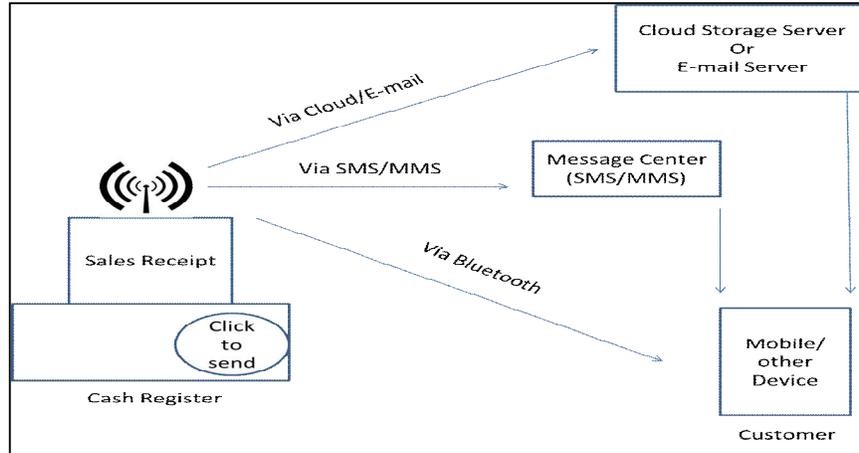


Figure1: Implementation Diagram of the Digital Receipt System

5. Comparative Study

	Bluetooth	SMS/MMS	E-Mail	Cloud
Requirements: Customer	The customers' mobile/device should have Bluetooth device attached	The customers' mobile/device should have the service of receiving SMS/MMS enabled	The customer must have an E-Mail account that is trustworthy enough and activated.	The Customer just needs to have an E-Mail Id or shall have username of the same cloud provider as of the shop.
Requirements: Business	A Bluetooth service available in the cash registers	Messaging service should be available at the cash registers	An E-mail server to send emails to the customers	The Cloud storage be bought by the company.
Advantages	The customer gets the digital receipt on the spot and in his hands	The customer gets the receipt on the device he/she wishes to through the cell number provided	The customer shall receive the receipt on his E-Mail that shall be safely kept for long time on the Mail Server.	The receipt could be easily shared with the E-mail Id provided by the customer over the cloud. Beneficial for both the customer and the firm.

Table 1: Comparison between the Different Ways of Implementing the Digital Receipts

6. Conclusion

Through this paper we conclude that the digital receipts could be a viable replacement of the printed paper receipts used at present by the billers. The digital receipts save time & money of both the customers and the company too. The main advantage is its positive impact on the environment as it reduces the use of paper on a large scale. As from a cord of tree, manufacturers produce 2,700 copies of a 35 page newspaper [6]. Almost if a single chain of stores nationwide implements this, a tree could be saved a day and will help the environment and will secure our future. Also the customers will be worry free with the state Receipts as in the paper, it may get spoilt under any possible circumstances. So the Digital receipts are profitable for all, Business firms, customers and the environment. Also in the conditions where any of the IT options mentioned in the paper above of receiving the receipts the customer can simply get a printed receipt as the default functionality of the cash register includes printing machine, but this shall only be used in genuine case like customer not having Bluetooth mobile and doesn't have Email or doesn't even have a cell phone etc.. in cases like these a printed

receipt shall only be feasible option. Though we are talking of superstore chains where these situations are only one or two in a thousand or so. Hence digital receipts could be incorporated in the billing system of modern business techniques.

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## Post Mining Of Frequent Item Sets Using Mutual Information

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### **Abstract:**

*Buyers' Basket Analysis (BBA or Market Basket Analysis) is a typical example of frequent item set mining that leads to the discovery of association and correlations among items in large transactional or relational data sets to help retailers to develop marketing strategies by gaining insight into which items are frequently purchased together by customers. Association rules are considered interesting if they satisfy both a minimum support threshold and minimum confidence threshold, set by domain experts. Many efficient algorithms like Apriori, Partitioning, Sampling, Eclat etc. are available to generate large number of associated frequent item sets. Additional analysis can be performed to discover interesting statistical correlations between associated items. But the above mentioned correlation measures works in linear relationship between two variables with random distribution; this value alone may not be sufficient to evaluate a system where these assumptions are not valid. Finally we propose a new measure i.e. mutual information that will show dependency between frequent item sets of linear and parabolic datasets and generate stronger associated frequent item sets.*

**Key words:** Frequent Item sets, Association rules, mutual information

### **1. Introduction**

Buyers' Basket Analysis (BBA or Market Basket Analysis) is a well known technique of data mining to analyze customer behavior. It is based on association rule mining. The goal of BBA is to identify relationship (i.e. association rules) between groups of products, items or category taken from a large dataset [6]. It helps in increasing sales and maintain inventory by focusing on the point of sale transaction data. Association rule mining is a two step approach i.e. first it finds all frequent item sets using minimum support threshold and then generate strong association rules that satisfy minimum support and minimum confidence. Frequent item set mining and association rule induction [[2],[3],[4]] are powerful methods for Buyers' Basket Analysis. The main problem of association rule induction is that there are many possible rules[3]. It is obvious that such a vast amount of rules cannot be processed by inspecting each one in turn. Therefore efficient algorithms are needed which restrict the search space and check only a subset of all rules, but, if possible, without missing important rules. One such algorithm is the Apriori algorithm which was developed by R. Agrawal & R. Srikant [[3],[4]] for mining frequent item sets for boolean association rules. But the problem of Apriori algorithm is that it requires many scans to generate a large number of frequent item sets. Many other algorithms (partitioning, sampling, Eclat etc.) are present which focus on improving the efficiency of the original Apriori algorithm. But the use of only support and confidence measures to mine associations may generate huge numbers of frequent item sets which can be uninteresting to users [14],[15]. Overviews of measures (subjective and objective) of interestingness are also used to find frequent item sets [13]. There are some additional analysis of post mining data that can be performed to discover interesting statistical correlation (lift, all\_confidence, Cosine etc.) between frequently associated items. But all the above mentioned correlation measures works on linear data sets. In this paper we propose a new measure like mutual information to find frequently associated item sets not only from linear data sets but also from parabolic data sets.

### **2. Background**

Buyers' Basket Analysis (BBA) is based upon association rule mining. Let  $I = \{I_1, I_2, \dots, I_m\}$  be a set of Items. Let  $D$ , be a set of database transactions where each transaction  $T$  is a set of items such that  $T \subseteq I$ . An association rule is an implication of the form  $A \Rightarrow B$ , where  $A \subset I$ ,  $B \subset I$ , and  $A \cap B = \emptyset$  [1]. The two measures of association rule mining is Support and confidence.

$$\text{support}(A \Rightarrow B) = P(A \cup B) \dots(1)$$

$$\text{confidence}(A \Rightarrow B) = P(B|A) \dots(2)$$

The concept of binary association rules represent presence of item denoted by 1 and absence of item denoted by 0 [[5],[6]]. But association rule mining often generates a huge number of rules, and a majority of them either are redundant or do not reflect the true relationship among data objects [6]. To overcome this difficulty, correlation has been adopted as interesting measures. This leads to correlation rules of the form [12]

$A \Rightarrow B$  [support, confidence, correlation].

There are many different correlation measures for mining large data sets:-

1. **Lift** :-The lift between the occurrence of item sets A and B can be measured by computing

$$\text{lift}(A, B) = \frac{P(A \cup B)}{P(A)P(B)} \dots(3)$$

Positively correlated : lift > 1.

Negatively correlated: lift < 1.

No Correlation : lift = 1.

2. **Chi-Square (X<sup>2</sup>)**:-

$$\chi^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}} \dots(4)$$

1. **All confidence**:-

$$\text{all\_conf}(X) = \frac{\text{sup}(X)}{\text{max\_item\_sup}(X)} \dots(5)$$

2. **Cosine**:-

$$\text{cosine}(A, B) = \frac{P(A \cup B)}{\sqrt{P(A) \times P(B)}}$$

$$= \frac{\text{sup}(A \cup B)}{\sqrt{\text{sup}(A) \times \text{sup}(B)}} \dots(6)$$

3. **Kulczynski**:-

$$\text{Kulc}(A, B) = \frac{1}{2} (P(A|B) + P(B|A)) \dots(7)$$

4. **Max-confidence**:-

$$\text{Maximum\_confi}(A, B) = \max \{ P(A|B), P(B|A) \} \dots(8)$$

(In the above formulae, A, B, X are the data item sets, P represent probability)

Each of the above six co-relation measure value range from 0 to 1 and higher the value, the closer the relationship between A and B [1].

### 3. Problems with Objective & Subjective Measure

Objective measures rely on user's ability to choose the right measure for a given scenario out of a huge set of available measures. Some measures produce similar rankings while others almost reverse the order. This poses the problem of choosing the right measure for a given scenario [[8], [9]]. Moreover, due to their rather mathematical foundation most measures lack interpretability and

meaningfulness because the rule properties they measure rarely reflect the practical considerations of a user. For a user it is often unclear which measure to choose and how to link its results to his application scenario. Objective measures do not memorize the past and they are unable to identify patterns which have already been discovered multiple times in the past, which are diminishing or emerging [[10], [11]].

Subjective measures, on the other hand, require user's domain knowledge. A lot of effort is necessary to collect, organize and finally incorporate domain knowledge into a knowledge base against which association rules will be compared. Moreover, domain experts often forget certain key aspects or may not remember others which come into play under rarer circumstances. This problem can be termed 'expert dilemma' 1980s [11]. Building a knowledge base can also become a task that can never be finished. Consequently, there is a risk that patterns are regarded as interesting based on outdated knowledge while a user is being left uninformed about the out datedness itself [13].

Here our propose measure i.e. using mutual information, we can get most frequent item set more accurately than using correlation measures.

The correlation co-efficient indicates the strength of a linear relationship between two variables with random distribution; this value alone may not be sufficient to evaluate a system where these assumptions are not valid. The mutual information measures the general dependency while the correlation function measures the linear dependency. Another major difference between mutual information and correlation function is that the former can be applied to symbolic sequences as well as numerical sequences, but the latter can only be used on numerical sequences. For example, we can have zero value of correlation function at some distance  $d$ , while the mutual information function at that distance can be any value.

#### 4. Information Theory

The concept of mutual information is quite complex and is the basis of information theory. Information theory is a branch of computer science involving quantification of information. Information theory was developed by Claude E Shannon [[23],[24],[25]]. Since its inception it has broadened to find applications in many other areas, including statistical inference [[17],[22]].

##### 4.1. Mutual Information

Mutual information (also referred to as transinformation) is a quantitative measurement of how much one random variable (Y) tells us about another random variable (X) [16]. In this case, information is thought of as a reduction in the uncertainty of a variable. Thus, the more mutual information between X and Y, the less uncertainty there is in X knowing Y or Y knowing X.

Mutual information is most commonly measured in logarithms of base 2 (bits) but is also found in base e (nats) and base 10 (bans).

The mathematical representation for mutual information of the random variables X and Y are as follows:

$$I(X;Y) = \sum_{y \in Y} \sum_{x \in X} p(x,y) \log \left( \frac{p(x,y)}{p(x)p(y)} \right)$$

where,  $p(x,y)$  = joint probability distribution function of X and Y.

$p(x)$  = marginal probability distribution function of X.

$p(y)$  = marginal probability distribution function of Y [[18],[19],[20]].

##### 4.2. Kullback-Leibler Divergence Theory

Mutual information can also be expressed as a Kullback-Leibler distance. The mutual information between a random variable X and Y is the Kullback-Leibler distance between the joint distribution  $P(X,Y)$  and the product of the marginal  $P(X)P(Y)$ :

$$I(X;Y) = D_{KL}(p(x,y) || p(x)p(y))$$

If X and Y are independent, so that  $P(X,Y) = P(X)P(Y)$ , then

$$\log \left( \frac{p(x,y)}{p(x)p(y)} \right) = \log 1 = 0 \quad \dots(11)$$

$I(X;Y) = 0$ . That is Y tells no information at all about X.

Using the definitions of mutual information, it is straightforward to show that the mutual information can also be written as

$I(X;Y) = H(X) - H(X|Y)$ .

From this definition we can say mutual information is the difference between the average uncertainty in X and the uncertainty in X there still is after measuring Y. Thus it quantifies how much information Y tells about X [22].

### 4.3. Properties Of Mutual Information

- A basic property of the mutual information is that knowing Y, we can save an average of bits in encoding X compared to not knowing Y.
- Mutual information is symmetric (i.e.  $I(X;Y) = I(Y;X)$ ).
- Mutual information  $I(X;Y)$  can never be negative (i.e.  $I(X;Y) \geq 0$ ;). [  $D(P || Q) \geq 0$  ]

From the above discussion it is clear that though Mutual information is a measure of the dependency between two variables, if the two variables are independent, the mutual information between them is zero. If the two are strongly dependent, e.g., one is a function of another; the mutual information between them is large.

### 5. Experiment and Result

We collect a transactional data (File Test data) and using Matlab version 9.0, we generate frequent item sets using association rule mining algorithm. Then we collect frequent item sets and calculate correlation measures over them. Following are the details:-

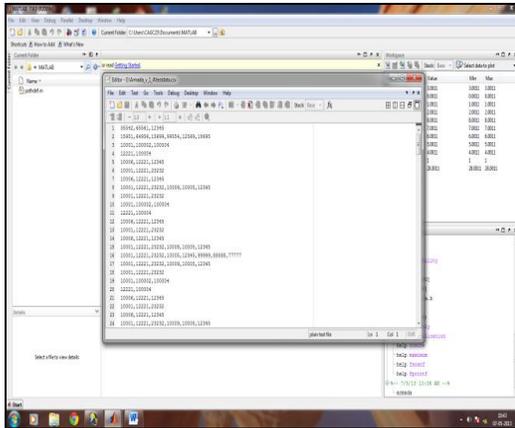


Figure 1: Test Data Element In Matlab 9.0

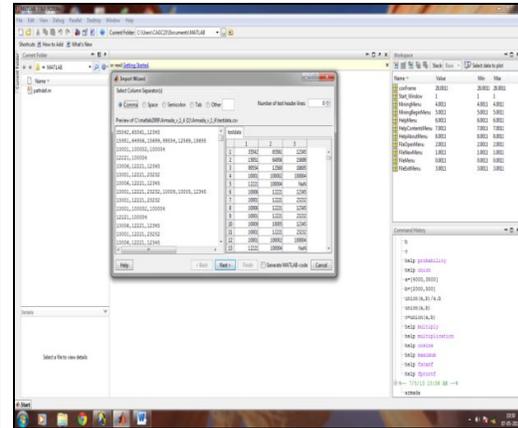


Figure 2: Generate Frequent Item Set Using Association Rule Mining Algorithm IN Matlab 9.0



Figure 3: Frequent Item Sets Generation From "Test Data" File In Matlab 9.0

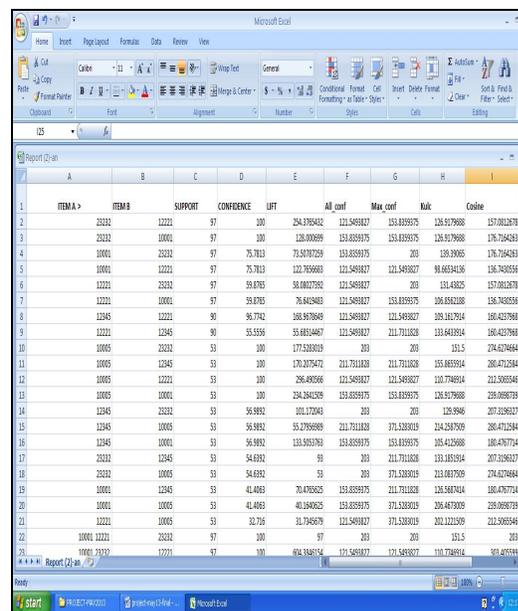


Figure 4: Calculation Of Correlation Over Frequent Item Sets Generated From Test Data Using (1),(2),...(6) Equations

In this paper we already have done correlation analysis on test data and we calculate P(A) and P(B) [ Probability of item A and Probability of item B]. From the above example, we take all the possible combination of two items such as ITEM A 23232 and ITEM B 12221 and we make a contingency table below

	12221	12221	Σ row
23232	97	68	165
23232	18	20	38
Σ col	115	88	203

Table 1: Contingency table of Item A 23232 and Item B 12221

	12221	12221	Σrow
23232	97/203 =0.47783	68/203 =0.33497	165/203 =0.81280
23232	18/203 =0.88669	20/203 =0.98522	38/203 =0.18719
Σ col	115/203 =0.56650	88/203 =0.43349	203/203 =1

TABLE 2: CALCULATION OF MUTUAL INFORMATION

$$\begin{aligned}
 & I(23232, 12221) \\
 &= 0.47783 \log \frac{0.47783}{0.81280 * 0.56650} \\
 &+ 0.33497 \log \frac{0.33497}{0.81280 * 0.433497} \\
 &+ 0.88669 \log \frac{0.88669}{0.18719 * 0.56650} \\
 &+ 0.98522 \log \frac{0.98522}{0.18719 * 0.433497} \\
 &= 0.025539618 + (-0.024432419) + 2.716621827 + 3.548636264 \\
 &= 6.266365289
 \end{aligned}$$

From the above calculation we see that the value of mutual information is large i.e. the above two items are strongly related. We can calculate the mutual information values taking other items of Test data such as (10001 12221; 23232) or (10001 12221 12345; 23232) or (10001 10005 12221 12345; 23232) in the same way to find the dependency between two variables.

**6. Conclusion**

So from this above discussion we can say, Correlation measures which is used in the linear relationship (Pearson's correlation) or monotonic relationship between two variables, X and Y, whereas Mutual information is more general and measures the reduction of uncertainty in Y after observing X. Mutual information is based on information theory and it works not only in linear data but also in parabolic datasets. Mutual information helps reduce the range of the probability density function (reduction in the uncertainty) for a random variable X if the variable Y is known. The value of I(X; Y) is relative, and the larger its value, the more information that is known of X. It is generally beneficial to try to maximize the value of I(X; Y), thus minimizing uncertainty. So, if we imply mutual information as a measure to get stronger associated frequent item sets in linear and parabolic item sets, it will work more accurately than other measures which we discussed earlier.

## 7. Acknowledgement

Many people have cooperated with us during the process of translating a collection of ideas into this research. So, we take this opportunity to thank all for giving us the opportunity to complete this paper.

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## Computation of Data Cube: A Data Mining Technique

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### **Abstract:**

*This paper work is aimed to give a comprehensive view about the links between computation regarding data hierarchy through data cubes and data mining. The paper discusses the possibilities of hierarchical data computation, data mining and knowledge discovery. In this paper data mining algorithms are analyzed and the extracted knowledge is represented using On Line Analytical Processing cubes systems. The performance of the computational techniques and the ability to interpret it is have taken with vital importance. Also the resulting proposals have presented to be easy to understand. This is where the data cubes computational techniques come into picture as they satisfy the today's requirements.*

**Key words:** Data Mining, Data Cube, Attribute, Hierarchy, On Line Analytical Processing (OLAP)

### **1. Introduction**

In today's world there is a keep increasing amount of data, hence there must be some computational techniques for extracting the useful data from this vast quantity of data. But most of the data that we have is in the form of unstructured format as the some processes themselves do not have proper definitions to recognize that. Hence we need a computational system that can use this incomplete information. The guiding principle for data mining is the challenge to expand the large amount of variety of data in usefully manner so that it can be taken for consideration for requirement. In data mining, to manipulate the large amount of data, it has carious methods such as artificial neural networks, Decision trees, and the nearest-neighbor method and so on. Regardless of the technique used, the real value behind data mining is modeling is the process of building a model based on user-specified criteria from already captured data. The already captured data may have the some hierarchy and that hierarchy provides the data in unstructured as well as in "what-if" situations. So the data hierarchy is an arrangement of data consisting of sets and subsets such that every subset of a set is of lower rank than the set. Simple suggested Data Hierarchy refers to the systematic organization of data, often in a hierarchical form. That data organization involves fields, records, files and so on. So by computing (by mining) the data to find out the solution for a situation it may solve the problem. The techniques used for finding particular reason and with particular search we aim to apply techniques to data mining.

The distinction between data, information, knowledge and wisdom is foundational. An almost universally accepted view of these relationships was articulated by Stephen Tuthill at 3M in 1990.



Figure 1

## 2. Online Analytical Processing Cube

An online analytical processing (OLAP) is a computer-based technique for analyzing large variety of data in the search for business intelligence. An OLAP cube is an array of data understood in terms of its 0 or more dimensions. A cube can be considered as a generalization of a three-dimensional spreadsheet. Cube is can be considered as shortcut for multidimensional dataset, given that data can have an arbitrary number of dimensions. The term hypercube is sometimes used, especially for data with more than three dimensions. For example, a company might wish to summarize financial data by product, by time-period, and by city to compare actual and budget expenses. Product, time, city and scenario (actual and budget) are the data's dimensions. The goal is to retrieve the decision support information from the data hierarchy with the help of cube in the most efficient way possible.

Data cubes are inherently multidimensional, with each dimension modeled with a hierarchy defining the levels of detail to use when aggregating the base fact table. In the simple case, these hierarchies are simple, uniform, and non branching so that there is only a single way to define the levels of detail for any particular dimension, i.e., a single path along that dimension. This type of data is commonly modeled using a star schema and is the type of data we have used in this paper to show how users can independently zoom on multiple hierarchies within a single visualization by associating hierarchies with the axes of a visualization.

## 3. Representation and Operations on Data Cubes in Data Hierarchy

Not only are data cubes widely used, but they also provide a powerful mechanism for performing data abstraction that we can as per requirements and for future purpose. A data cube is constructed from a subset of attributes in the database or from the data hierarchy. Certain attributes are chosen to be measure attributes, i.e., the attributes whose values are of interest. Other attributes are selected as dimensions or functional attributes. The measure attributes are aggregated according to the dimensions. In data Hierarchy, if it is represented in the form of above example the tables are two-dimensional representations of data, using columns and rows. Data cubes are multi-dimensional extensions of two-dimensional tables. A data cube can be thought of as a set of similar 2D tables stacked on top of each other. Data cubes categorize information into two classes: dimensions and measures, corresponding to the independent and dependent variables, respectively.

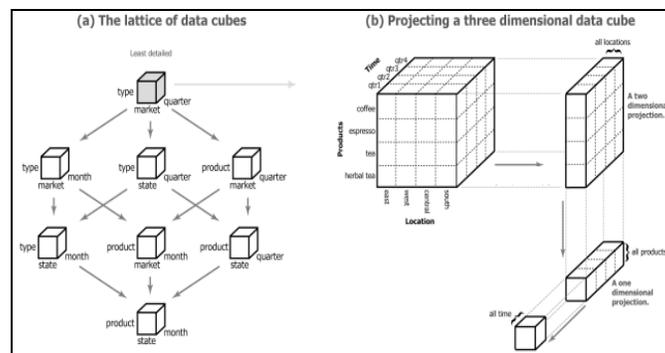


Figure 2

Figure 2 The lattice of data cubes for a data base with three dimensions: Products (with levels Type and Product), Time (with levels Quarter and Month), and Location (with levels Market and State). (b) Several projections of the least detailed data cube in the lattice.

In array based computation, it takes base cuboid  $X$  of an  $n$ -dimensional data cube stored in an array. That array may be in compressed format if sparse array techniques are used. Then that array may be chunked if too large in hierarchy and the base cuboid itself may need to be computed separately from raw hierarchical data. Its result is in the form of all cube, i.e., all cuboids except the base cuboid. The computed cuboids are stored on disk also as arrays can be used for the data centralization and generalization. It may also be stored together with base cuboid as extended array.

## 4. m-Dimensional Array

A data cube built from  $m$  attributes can be stored as an  $m$ -dimensional array. Each element of the array contains the measure value, such as count. The array itself can be represented as a 1-dimensional array. For example, a 2-dimensional array of size  $(x \times y)$  can be stored as a 1-dimensional array of size  $x*y$ , where element  $(i,j)$  in the 2-D array is stored in location  $(y*i+j)$  in the 1-D array. The disadvantage of storing the cube directly as an array is that most data cubes are sparse, so the array will contain many empty elements (zero values).

## 5. List of Ordered Sets

To save storage space we can store the cube as a sparse array or a list of ordered sets. If we store all cells in the data cube then the resulting data cube will contain  $(x \times y \times z)$  combinations, which is might be large number in combinations. An ordered set representation of the data cube is that in which each attribute value combination is paired with its corresponding count. This representation can be easily stored in a database table to facilitate queries on the data cube.

To compute all  $2^n$  cuboids of an n-dimensional data cube, it may have each cuboids may be computed as a group-by arrangement such as a group like ABC a combination of data hierarchy in which group by A, B, C respectively every member, AB a group by A, B and A group by A alone and last All an empty group-by arrangement.

Sometimes we use cuboids and group-bys interchangeably, but a cuboids may correspond to multiple group-bys arrangement such as AB may be computed from “group by A, B” or “group by B, A” it means the different orders of data element from hierarchy computation may have very different costs and requirements.

Data Cube operators generalize the histogram, cross tabulation, roll-up, drill-down and sub-total constructs required by databases. The following operations can be defined on the data cube.

- a. Pivoting involves rotating the cube to change the dimensional orientation of a report or page on display. It may consist of swapping the two dimensions (row and column in a 2D-cube) or introducing another dimension instead of some dimension already present in the cube.
- b. Slicing-dicing involves selecting some subset of the cube. For a fixed attribute value in a given dimension, it reports all the values for all the other dimensions. It can be visualized as slice of the data in a 3D-cube. Some dimensions have a hierarchy defined on them. Aggregations can be done at different levels of hierarchy.
- c. Rollup or summarization of the data cube can be done by traversing upwards through a concept hierarchy. A concept hierarchy maps a set of low level concepts to higher level, more general concepts. It can be used to summarize information in the data cube. As the values are combined, cardinalities shrink and the cube gets smaller. Generalizing can be thought of as computing some of the summary total cells that contain ANYs, and storing those in favor of the original cells. To reduce the size of the data cube, we can summarize the data by computing the cube at a higher level in the concept hierarchy. A non-summarized cube would be computed at the lowest level. The final result of summarizing the data by introducing the dimensions till the process could be continued to further generalize.
- d. Drill-down is similar to Rollup, but is in reverse. A drill-down goes from less detailed data to more detailed data. To drill-down, we can either traverse down a concept hierarchy or add another dimension to the data cube. This is a reversal of the summarization process.

In the multidimensional data hierarchical model for data, there exist in the form of star schema, snowflake schema, or fact constellation schema to work on OLAP cubes or data cubes.

- a. Distributive: If the result derived by applying the function to n aggregate values is the same as that derived by applying the function on all the data without partitioning. Functions like count(), sum(), min(), max().
- b. Algebraic: Use distributive aggregate functions. If it can be computed by an algebraic function with M arguments (where M is a bounded integer), each of which is obtained by applying a distributive aggregate function. Functions like avg(), min\_N(), standard deviation().
- c. Holistic: If there is no constant bound on the storage size needed to describe a sub aggregate. Functions like median(), mode(), rank().

A data cube function is a numerical function that can be evaluated at each point in the data hierarchy

## 6. Key Points

The data cube operation can be expressed in high-level languages like SQL and other query structured languages in the form of a disjunction of group by queries. A query optimizer would then (ideally) combine all the queries into a single query result. Intuitively, this naive algorithm divides the full cubing task into a set of aggregation tasks, one for each cube group, and distributes them for computation using the language framework.

However, as the scale of data increases, it moves towards key challenges that cause the computations to perform poorly and eventually fail. Those are i. size of intermediate data, ii. Size of large groups as described next.

- i. Size of Intermediate Data: The first challenge arises from the large size of intermediate data being generated from the various phase of mining process.
- ii. Size of Large Groups: The second situation arises from cube groups belonging to cube regions at the bottom part of the cube hierarchy. The reducer that is assigned the latter group essentially has to compute the measure for the entire dataset, which is usually large enough to cause the reducer to take significantly longer time to finish than others or even fail. As the size of the data increases, the number of such groups also increases. We call such groups’ reducer unfriendly. A cube region with a significant percentage of reducer-unfriendly groups is called reducer-unfriendly region.

For algebraic measures, this situations can addressed by not processing those groups directly: we can first compute only for those smaller, reducer friendly, groups, then combine those measures to produce the measure for the larger, reducer-unfriendly groups. Such computations are also responsive to suggestion which further decreases the load on the shuffle and reduce phases. For holistic measures, however, computations for larger groups cannot be assembled from their smaller groups, and hence any one may need a different approach for computing the data cubes.

## 7. Conclusion

Data Mining Process is fast gaining importance for business data analysis using large amounts of data now available in data warehouses. Data Cubes aggregations are an important function of OLAP queries and can benefit. Multidimensional databases model the multi-dimensionality of data intuitively, providing support for complex analytical queries, also being responsive to requirement. Summary results in the data cube can be used to perform data mining through attribute focusing methods. I have presented a general discussion regarding data cube computation with the help of data mining to perform attribute focusing on the data cube. In this article, I presented techniques for computing the attributes of multidimensional data cubes with data mining.

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## Using Mobile Apps for Research: An Emerging Trend in LIS Profession

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### **Abstract:**

*With advancements in technology and the rise in Smartphone use, people are taking advantage of being connected to data wherever they are. Mobile phones aren't just phones anymore: they can access e-mail, search the Web, video chat, and play games. Even mobile devices can bring social media, productivity tools, and entertainment literally into the palm of your hand. In this scenario, libraries need to position its research resources to today's generation's changing information needs. The libraries need to explore mobile devices as a way to connect with patrons. The resources mentioned in the paper will help libraries begin to plan and implement their own unique mobile presence. The paper talks about the various mobile apps which can be used for Research. The paper focuses on consideration for Librarians and Vendors. The paper also discusses the future of Mobile use.*

**Key words:** *Mobile Technologies, Mobile Applications, Mobile Web browsers, Academic Library, E-Databases, online research tools*

### **1. Introduction**

The globalization of markets accompanied by rapid change in information technology has increased the competitiveness in most industries. The libraries are not exception to this. Media transformation and ICTs have brought in unprecedented changes in the way the information is gathered, stored, organized, accessed, retrieved and consumed. The journey of libraries from analog to hybrid to digital has posed both challenges and opportunities as well for library professionals. The constant change in generation and delivery of information leave library professionals with no alternative but to adapt their services in response to technological developments. A library is experiencing a paradigm shift in their services due to advancement in IT. Use of latest technologies in providing services has enhanced the structure of library services to be provided to the users.

A growing number of library users are engaging mobile devices as search tools. Smart Phones cell phones, iphones, and tablets are now commonly among the first places people turn when seeking information. When one confronted with the need to do serious research, does he reach first for mobile devices, a laptop or desktop computer? In today's scenario, most of the users will prefer searching information using mobile apps. The recent explosion in popularity of mobile applications (apps), the phrase "There's an app for that" has entered the popular vocabulary with a vengeance and it has fueled a new direction in mobile search. Many information resources and portals have created mobile applications as powerful gateways to their online resources. Major search engines, as diverse as Google, Bing, and Wolfram Alpha now offer powerful search experiences via Smartphone applications. Newspapers, from The Wall Street Journal to The Times of India to local city dailies, have created mobile versions, which are optimized for reading on a cell phone screen. These tools have set the stage and offered lessons for libraries and information vendors pursuing mobile search projects.

## 2. Why Should We Care About Mobile Devices?

In the Hands of Millions			
Top 10 countries with mobile Populations			
Rank	Country	Mobile Phones (MN)	% of Population
1	China	1170	85.21
2	India	864	68.72
3	United states	327	103.29
4	Indonesia	281	118.6
5	Brazil	263	136.7
6	Russia	261	183.0
7	Japan	138	108.0
8	Vietnam	134	146.5
9	Pakistan	122	68.83
10	Nigeria	114	69.0

Table 1: Mobile Subscription Population in Top 10 Countries

Source: ITU, National Telecommunication Ministries and Regulatory Authorities, June 2013

According to International Communications Union (ITU) in early 2013, the world had 6.8 billion mobile subscriptions, with more than half- 3.5 billion- in the Asia-Pacific region. Of the Asia-Pacific region, India and China alone constitute more than 2 billion mobile subscriptions, as the two countries that sit at the head of the list of the top 10 countries with mobile subscriptions. Mobile Internet users in India are expected to hit 165 million by March 2015. By 2015, 80 per cent of the world's mobile handsets will be smart phones — with much of the growth coming from emerging markets. CCS further predicts that by 2017, the combined number of mobile phones and tablets in use will exceed the world population. Gartner, another leading information technology research and advisory firm, predicts combined shipment of PCs, tablets and mobile phones to reach 2.4 billion units this year. The research shows a decline in the PC markets to 7.6 per cent as consumers' transition to tablets and ultra-mobiles. [6]

As per survey of TCS on Indian students conducted during 2012-2013, nearly 70 percent of Indian students own a Smartphone, with more user base in smaller cities than metros. The findings of survey of Indian teenagers across 14 Indian cities that smart devices and unprecedented levels of online access are making this generation the most connected yet. This is changing the way they communicate with each other and transforming both their academic and social lives. "Research for school" is as the main reason to access the Internet followed by social reasons like chatting/connecting with friends. [3]

Thus, in today's scenario, mobile phones play a vital role in the information communication. The information industry is adapting to reflect this shift in user behavior. Today's generation rely more heavily on mobile devices. They are becoming more willing to embrace the use of mobile technologies for searching and advance research. With the mainstreaming devices, libraries can no longer ignore this importance trend. Hence, in order to tune to today's users' mobile technology habits, libraries need to mobilize the library resources and services and make ourselves accessible to patrons whenever they are, from a device that fits in their pocket.

## 3. Integrating Library Resources with Mobile Technologies

Searching information using Internet from the Desktop Computers to laptops to using Mobile Apps for research, the library resources and services have experienced paradigm shift. The users' information needs are changed over the period of time. Today's Libraries need to take a new channel to provide their resources, services and Research tools to today's generations and staytuned with users. Therefore, it is crucial for librarians to understand mobile devices and provide services through them.



#### 4. What is Mobile APPs?

Mobile apps are pieces of software produced by third parties such as businesses or services that people can download onto their smart phones.[4]A mobile application (or mobile app) is a software application designed to run on Smartphone, tablet computers and other mobile devices. They are usually available through application distribution platforms, which are typically operated by the owner of the mobile operating system, such as the Apple App Store, Google Play, Windows Phone Store, and BlackBerry App World. Some apps are free, while others must be bought.

#### 5. Mobile Apps for Library Research

The recent explosion in popularity of mobile applications has given a new direction in Mobile search. Many Information resources and portals have created mobile applications as powerful gateways to their online resources. There are apps for those information companies have begun to make their tools accessible to mobile searchers by introducing mobile search gateways in the form of smart phone applications or mobile web platforms. There are variety of mobile Apps for research, reading, writing and other essential tools for studying on the go. The Apps are available for Apple iPad, iPhone, and Android devices, which can be downloaded from Apple App store or Google Play. Some apps are free, while others are paid. In case of proprietary databases, only institutional library subscribers can access databases using Mobile Apps or mobile browsers.

#### Category- Reference:



Dictionary.com (Free): Search over one million definitions, synonyms, antonyms without an internet connection. Includes voice search, audio pronunciation, and word origin and history.



Google (Free): Search the web with the Google search app. The app includes enhanced features such as Voice Search, Search Nearby, and Google Goggles (visual search engine that allows you to snap a photo of a product, book, painting, or landmark to find more information).



Google Translate (Free): Translate words and phrases in over 50 languages. For most languages, you can speak your phrases and hear the corresponding translations.



Merriam-Webster Dictionary (Free): Use voice search to look up definitions in Merriam-Webster's Collegiate Dictionary.



Wikipedia (Free): Mobile app for searching the popular online encyclopaedia, Wikipedia. Includes advanced features such as table of contents browsing, history, bookmarking, and in-page searching.



arXiv (Free): Open access to 864,151 e-prints in Physics, Mathematics, Computer Science, Quantitative Biology, Quantitative Finance and Statistics Subject search and browse



iSSRN (Free for Apple iOS): Search over 260,000 research papers in the social sciences and humanities available from the open access repository of the Social Science Research Network (SSRN).



WolframAlpha(Paid):Computational knowledge engine covering a variety of subject areas and offering everything from definitions, biographies, and statistics to mathematical formulas, chemical properties, and stock quotes.



World Atlas by National Geographic (Paid): Detailed interactive world maps.



World Factbook 2011 (Paid) :Information on over 250 countries around the world including natural resources, industries, GDP, religion, ethnic groups, legal system and much more.

#### **Category : Proprietary Databases**



EBSCOhost :Search for articles across all EBSCOhost databases including Academic Search Premier, Business Source Premier, CINAHL, ERIC, and many more. Users on authenticated devices can select and search a wide variety of and figures and graphs from articles as images.



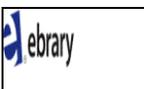
SciVerseScienceDirect : Access to Abstracts and full text of scholarly literature in science, technology, and medicine.



SpringerLink : Abstracts and full text of scholarly articles and book chapters covering every area of science, technology and medicines.



Nature Publishing Group : Nature Journal App is available free for ipads, iphones through Apple App store, while Mobile-optimized website is available for iPad, iPhone, iPod touch, Android devices, Blackberry (latest model), Windows 7 devices and most other tablets.



Ebrary: ebrary's iOS and Android apps, researchers can access content on the ebrary platform, including their institution's ebooks from leading publishers and documents uploaded by librarians with DASH.



Emerald insight : Provides access to Journals through Mobile Apps for Apple iOS and designed mobile browser for use on any mobile device with a web browser, including Apple iOS, Android, Blackberry and other platforms

### **Category: Reading**



Free Book Reader (Free): Book Reader offers free access to thousands of books in all genres and access to multiple book networks to



Zinio Magazine Reader(Free): offers thousand of digital magazines from around the world in a newsstand. It offers access to magazine offline and on the go.



Numilog eBook Reader (Free): Download thousands of eBooks on your Android Smartphone or tablet amongst the largest French eBooks catalog.



OverDrive Media Console (Free): allows you to search for, download, and enjoy e-books and audio books from your public, school or college Library.



Amazon Kindle (Free): Amazon Kindle is a series of e-book readers designed. Amazon Kindle devices enable users to shop for, download, browse, and read e-books, newspapers, magazines, blogs, and other digital media via wireless networking.



newshunt (Free) : provides access to regional newspapers.



IndiaNewspaper (Free): Provides access to major Indian Newspapers, magazines and news sites online.



Book Mobile (Free): Build your personal library at home or in the store.



Library Thing scanner (Free): Library Thing scanner uses the Barcode scanner app to read the ISBN barcode from a book. The web browser then opens at the Library Thing add book page.



Book catalogue (Free): An open source book cataloguing application. Books can be added manually, by ISBN, or barcode.



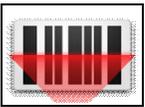
Codex (Free): This is an app which helps manage and catalogue, your books library. You can organize your books, manage your book loans and even create a book wish list to help you find the best prices for the books you wish to buy /read and remember where you found them.



World Cat (Free), for Apple iOS): is a union catalog that itemizes the collections of 72,000 libraries in 170 countries and territories which participate in the Online Computer Library Center (OCLC) global cooperative. It is built and maintained collectively by the participating libraries.



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Mindjet (Free): Enter ideas, topics, and concepts into intuitive visual maps that help you quickly organize your thoughts and outline projects.



My MLA (Paid): Mobile app for the MLA Handbook for Writers of Research Papers (7th ed.), offering examples for the general format of MLA research papers, in-text citations, endnotes/footnotes, and works cited.



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### **Category: Presenting**



Slide by Slide (Free) : Allows you to view Slideshare presentations on your iPad



Slideshare (free) : Allows you to view Slideshare presentation on Android devices.

### **6. Mobile Browsers On Your Phone**

Putting an app on your mobile device isn't the only way to access research information. Browsers are now appearing on mobile devices.[4] A mobile browser, also called a micro browser or wireless internet browser (WIB), is a web browser designated for use on a mobile device such as a mobile phone or PDA. Mobile browsers are optimized so as to display web content most efficiently for small screen on portable devices. Gearing resources to mobile web browsers and developing mobile web pages as opposed to mobile applications widens the potential audience to all mobile searchers. Nowadays, many database companies have created rich websites for mobile browsers. [4]

EBSCO, ProQuest, Emerald Insight, Nature Journal and many other e- databases also provide mobile access to its online resources via a mobile web browser- optimized site. Tailor-made for the smaller screens of mobile devices, these applications offer the most important features and functionality right in the palm of your hand—providing the same user-friendly and easy-to-use search experience that is available online

### **7. Consideration For Librarians And Publishers**

Before committing resources to mobile products, librarians should consider how to respond to the mobile revolution, how to react to vendor endeavors, and how to adapt skills and operations to welcome a mobile culture, how to respond to user's changing information seeking behavior. Thus includes keeping current on mobile technology and gaining personal familiarity with the mobile search experience. Librarians need to manage the shift to mobile search by exploring mobile literacy skills. Librarians should be able to orient the users with Mobile technology. Librarians need to establish new processes for managing access to mobile information resources. Librarians should consider the mobile search experience at every stage of a library's operations, from purchasing to providing access to end users.

Although Publishers of e-resources have shown a strong start towards mobile search, but, providing full access without compromising content is an important consideration. Publishers should develop an enterprise culture of adaptability that is responsive to the ever-shifting behaviors and expectations of mobile searchers. They should consider the user's information needs to strengthen and further enhance their mobile search projects and continue their success in this arena.[4]

### **8. Future Of Mobile Search**

Mobile devices are becoming a significant gateway to searching. We are seeing increased user demand for the convenience of searching on-the-go. The expanding mobile focus of information services is influencing users' expectations for engaging information tools.

Changes in information technology are now occurring the scale of months, not years. Other technologies that will impact mobile search in the near future are emerging gadgets such as the ipads and tablets that will change the perceived roles of mobile technology in research.

The users of mobile and small-screen devices will continue to be a factor in the continued development of library services.

Mobile phone has surpassed PCs and landline phones combined, so information needs of potential users constitutes a challenge for today's libraries. The mobile web is connecting people to information while they are on the go, so this is a great space for libraries!

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## Object Oriented Mobile Computing Based Numerical Methods For Harmonic Analysis in Electrical Networks

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### **Abstract:**

*This paper illustrates a novice method of computation of network currents affected by high order harmonics. The data is received from numeric meters installed at electrical substations and consumers situated at remote end. The data processing are done on a smart phone. The main benefit of these methods is saving in time required for visiting electrical installations and getting appropriate value of harmonically distorted currents. The numeric meter sends data to the web server of Central Monitoring System either through internet or through PLCC/OFC links. The web server is connected to GSM Network through which the data is received by the smart phone. This data is processed by conducting Object Oriented Numerical Methods based source code available in smart phone. For this purpose, the relevant compilers can be installed in the smart phone. The results are compared with numeric meter data installed at substation end and consumer end. The difference between ideal theoretical load current and actual harmonically distorted load current is found out from which the degree of harmonic distortion can be ascertained.*

**Key words:** Harmonics, Smart Phone, Sampling, Global System for Mobile Communication (GSM), Object Oriented Programming Language (OOPL), Iterative Numeric Methods

### **1. Introduction**

This paper illustrates a novice method of computation of harmonic distortion in the electrical network using object oriented iterative numerical methods. The relevant data is received from numeric meters installed at remote end installations and its processing is done on smart phone through which the concept of Automatic Meter Reading (AMR) can be implemented. [1] [2]. Harmonics are the integer multiple of the fundamental frequency of mainly current and voltage. In India the fundamental frequency of electricity is 50 Hz. High order harmonics are generated by the non-linear loads such as computers, ac and dc drives, inverters, home protectors, soft starters etc.[3] In short, harmonics are generated when electricity is controlled by electronics. Fig 1 shows fundamental and other harmonic components giving rise to a resultant harmonic wave. If high order harmonics other than fundamental are more, the resultant wave would be highly distorted. The effects of high order harmonic distortion such as overheating and failure of electrical equipments, erroneous meter readings, failure of capacitor banks, undue tripping of transformers and transmission lines etc. are quite detrimental. The problem of harmonics can be tackled by installing harmonic filters for which the detailed analysis of harmonics is required to be carried out. In order to conduct harmonic analysis, it is required to measure current, voltage and power harmonics in the system. Over a period of time, there had been significant developments in measurement of harmonics.

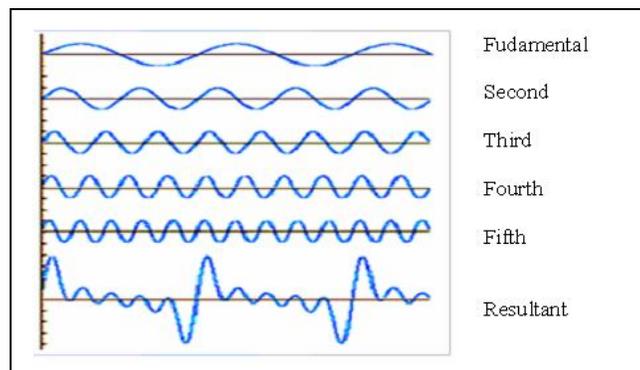


Figure 1: Fundamental and Other Harmonic Components Giving Rise to Harmonic Distortion

Harmonic Measurement has always been significant. Harmonics are measured at the point of common coupling between linear and non-linear loads. Therefore usually harmonics are measured at billing meter. The harmonics of current and voltage are measured by using the method of Fourier transforms. Harmonic waves are viewed basically on Cathode Ray Oscilloscope (CRO). However, it is not possible to accurately measure and analyze harmonics on CRO. The parameters such as Total Harmonic Distortion are not displayed by the CRO. The measurement and analysis of harmonics can be conducted on the traditional device called Harmonic Analyzer. It is a portable digital electronic device for harmonic measurements. During late nineties, the microprocessor based meters called numeric meters or digital meters were developed. These meters are provided within built Central Processing Unit (CPU) and Random Access Memory (RAM). These meters are also capable of conducting harmonic measurements. However, these existing equipments viz. Cathode Ray Oscilloscope, Harmonic Analyzer and Numeric meters do not perform remote measurements. In order to save time in visiting various electrical installations, it was felt necessary to transmit meter data over a longer distance and meet requirements of AMR. [4]. The remedy is implementation of mobile computing. As such, smart mobile phone is a convenient tool.

**2. Data Transmission**

At the utility substation, numeric meters are installed in a control panel. These numeric meters are connected to the modbus through RJ11 connectors. The RJ11 is an Ethernet connector. Modbus is RS485 / USB compatible bus. The meter data received at modbus is collected by Data Concentrator Unit (DCU). This data is stored in the local substation server. See Fig 2.

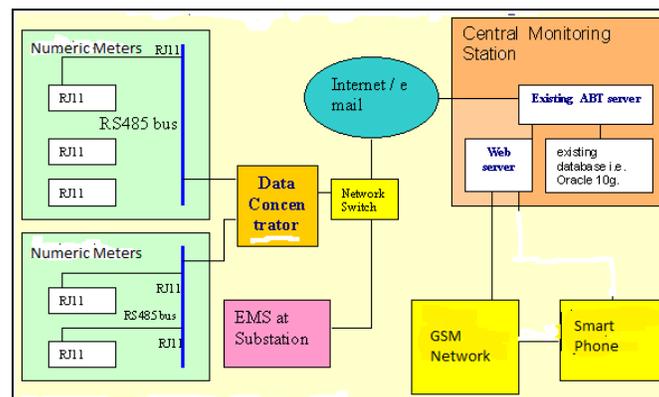


Figure 2: Functional Block Diagram Showing Flow of Data Signals From Numeric Meters Installed At Utility Substation to the Smart Phone

Through a wireless internet media, the data is sent to the Central Monitoring Station (CMS) via internet switch (router) and other network devices such as modem, bridge, hub, repeater etc. The data is transmitted through a communication satellite named as Very Small Aperture Terminal (VSAT). The data thus received at CMS is stored permanently in the Database server. Usually the RDBMS based Oracle server is provided. The data is also stored in the local server installed near metering installation.

Now, let us understand the working of network components in brief. Modem is the unit comprising of two components- modulator and demodulator. These components perform the function of modulation and demodulation of signals. The repeater amplifies these signals to reduce noise and attenuation. Number of repeaters is combined in a single unit called hub. Bridge is used to connect or disconnect the networks.

The another channel of data communication is a wired media. The data is sent through Remote Terminal Units (RTU) Data Acquisition System or Power Line Carrier Communication (PLCC) network integrated with Optical Fiber Cable (OFC). The wired communication is, however, out of scope of this paper. Both channels wired and wireless are used in practice.

### 3. Connectivity To The Smart Phone

The data received at CMS is also connected to the Web server. It is proposed to connect Web server to the GSM network (Global System for Mobile communication) as shown in Fig 2. From GSM network the link is provided to the smart phone. GSM describes protocols for digital cellular networks. [5]. The GSM network mainly comprises of GSM / GPRS modems suitable for long duration data transmission. The GSM modem is connected to the microcontroller which would transmit data from meter to cell phone and vice versa. [6]. The modem sends unit or pulses (power consumption) on regular interval or on request. [7].

Smart phone is a mobile phone built on Mobile operating System having more advanced computing capability than a feature phone. It is provided with in built CPU and RAM. The mobile operating system used by the smart phones are Google's Android, Apple's iOS, Nokia's Symbian, Microsoft's Windows phone and HP's webOS. [8][9].

The data is received at the input port of the smart phone. It is then processed by the in-built compiler of smart phone. [10]. The Android based C/C++/Java compilers are available. These compilers are installed in the smart phone. In order to process meter data, the source code is written. This source code written in high level language is compiled. The compiler translates source code into object code. These file formats are supported by Android or equivalent mobile operating system. The program output is displayed by emulator on the mobile screen. [11].

### 4. Numeric Analysis

Let us consider a simple example of a two bus system connected by a transmission line, as shown in Fig. 3.

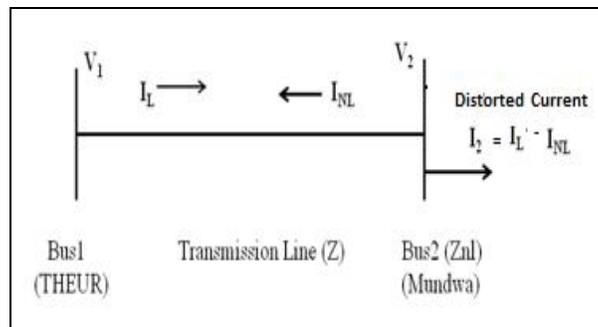


Figure 3: Two Bus System Model

The voltages at sending end (Theory) and receiving end (Mundwa) are  $V_1$  and  $V_2$  respectively. The voltage  $V_1$  at sending end is known. Due to fluctuations and high order harmonics, the voltage at receiving end is unknown and is required to be found out. Current  $I$  is flowing through the transmission line connecting Bus1 and Bus2. Bus2 is connected to consumers having non-linear loads. Therefore, load current  $I$  is flows through the Point of Common Coupling (PCC) of these consumers.

The impedance of transmission line is  $Z$  and the impedance of Bus2 is  $Z_{nl}$ . Now the following two equations can be written in terms of voltage and current at Bus2.

$$V_1 = IZ + V_2 \quad (1)$$

$$V_2 = IZ_{nl} \quad (2)$$

#### The Iterative Computation Using Numerical Methods:

The parameters  $V_1$ ,  $Z$  and  $Z_{nl}$  are known. The parameters  $I$  and  $V_2$  are required to be calculated. For simplicity, let us assume that  $V_2 = x$  and  $I = y$ . the above equations can be re-written as follows-

$$V_1 = y.Z + x \quad (3)$$

$$x = y.Z_{nl} \quad (4)$$

Now the values of  $x$  and  $y$  are found from equations (3) and (4) respectively as follows-

$$x = V_1 - y.Z \quad (5)$$

$$y = x/Z_{nl} \quad (6)$$

Now let us apply the numerical iterative methods to compute values of  $x$  and  $y$ . The commonly used numeric iterative methods are Gauss Iterative, Gauss Seidel and Newton Raphson Methods.

#### 4.1. Gauss-Iterative Method

The initial solution is guessed approximately and is used in conjunction with the original equation to compute first iteration. This first iteration is used to find the second iteration and the process is continued till convergence is achieved.

Applying Gauss-iterative method to eqn (5) and (6)-

Let  $x(0) = 1$  and  $y(0) = 1$ .

$$x = V_1 - y.Z = k_1 \text{ (say)} \quad (7)$$

$$y = 1 / Z_{nl} = k_2 \text{ (say)} \quad (8)$$

Substituting  $x$  and  $y$  in (5) and (6), we get,

$$x=V_1 - k_2Z = k_3 \text{ (say)} \quad \dots(9)$$

$$y= k_1 / Z_{nl} = k_4 \text{ (say)} \quad \dots(10)$$

Again substitute values of x and y in (5) and (6). Continue this process till the convergence is obtained.

In general,

$$x_{n+1}=V_1- y_nZ \quad \dots(11)$$

$$y_{n+1}=x_n/Z_{nl} \quad \dots(12)$$

In this way we can obtain voltage and current at receiving end using Gauss iterative method.

#### 4.2. Gauss-Seidel Method

In this method, the results of first iteration immediately replace the previous values in the next step.

In order to apply Gauss-Seidel method in the above example, we would still compute  $x_{n+1}$  using equation (11), and we have to substitute just computed  $x_{n+1}$  to compute  $y_{n+1}$ . Thus instead of eqns (11) and (12), the equations for Gauss-Seidel method will be as follows-

$$x_{n+1}= V_1- y_n.Z \quad \dots(13)$$

$$y_{n+1}= x_{n+1}/Z_{nl} \quad \dots(14)$$

#### 4.3. Newton-Raphson Method

Newton Raphson Method is based on Taylor's series and partial derivatives. The analysis is conducted by forming matrix and Jacobean models.

The objects of voltage  $V_2$  and current  $I$  are created using Object Oriented Programming Language (OOPL) and accordingly classes are formed .The source code would support OOPS based concepts such as inheritance, polymorphism, encapsulation and code reuse.

The harmonic distortion of current is calculated from the difference of measured value and actual value at receiving end. The difference between current at sending end and receiving end is also noticed.

### 5. Data Processing

The data related to harmonics received by the smart phone from numeric meters is processed. For this purpose the source code is written in a high level language such as C/C++ and Java. The source code is compiled by the compiler installed in the smart phone.



Figure 4: Text Editor of Smart Phone Compiler

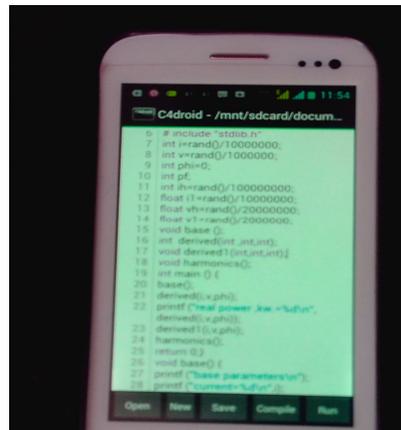


Figure 5: Use of Smart Phone as a Compiler

The example of Android based C compiler is shown in Fig 4. The compiler checks for errors in the program, if any. The programmer has to make respective corrections in the source code. The compiler then translates the source code into object code. The results of data processing are displayed on the mobile screen through an emulator. The source code can be easily written and compiled in smart phone. For this purpose , click 'new' button to enter a source code or click 'open' to open the saved code. The 'Save' button is clicked to save changes. The program is compiled by clicking on 'Compile' button. The program is compiled and errors, if any, are displayed. After removing errors, the 'run' button is clicked and the results are displayed. Fig 5 shows smart phone as a compiler. [12][13]. Fig 6 shows a display on terminal emulator.





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## Multi-Objective Recommender System For IT Governance Requirements

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### **Abstract:**

*IT Governance is a complex system. Information overload and an abundance of choices create situations where selecting one option becomes extremely difficult or even worse, a guessing game. Recommender systems are widely used to alleviate this problem by creating intelligent rankings of items based on an aggregation of user opinions. This research paper presents the multi-criteria ranking algorithm TOPSIS adapted to the problem of dynamic service selection provided based on IT Governance requirements.*

**Key words:** *IT Governance, multicriteria decision making, recommender system, intelligent ranking*

### **1. Introduction**

Information Technology (IT) is among the main capital investments and operating expenditures being made by organizations today. IT Governance (ITG) is specifying the decision rights and accountability framework to encourage desirable behavior in using IT [1]. ITG in a global context has to cater for intensive competition, cultural diversity, and various fluctuating economic conditions. ITG is a complex system. Each ITG implementation takes place in different conditions and circumstances determined by a large set of factors. Interoperability is one of the major challenges to be addressed in achieving an efficient ITG architecture [2].

The amount of information in the dynamic ITG environment is increasing far more quickly than our ability to process it. The recommendation is a way to help users in ITG to find information or services that are most likely to be interested or be relevant to their requirements.

### **2. Foundations**

#### *2.1. Recommender Systems*

There are generally two fundamental methods to formulate recommendations both depending on the type of items to be recommended, as well as, on the way that user models [3] are constructed. The two different approaches are content-based [4], [5] and collaborative filtering [6], while additional hybrid techniques have been proposed as well [4].

The challenges for recommendation algorithms expand to three key dimensions, identified as sparsity, scalability and cold-start [7].

**Sparsity:** Even users that are very active, result in rating just a few of the total number of items available in a database. As the majority of the recommendation algorithms are based on similarity measures computed over the co-rated set of items, large levels of sparsity are detrimental to recommendation systems.

**Scalability:** Recommendation algorithms are efficient in filtering in items that are interesting to users. They require computations that are expensive and grow non-linearly with the number of users and items in a database. Sophisticated data structures and advanced, scalable architectures are required.

**Cold-start:** An item cannot be recommended unless it has been rated by a substantial number of users. This problem applies to new and obscure items and is particularly detrimental to users with eclectic taste. Likewise, a new user has to rate a sufficient number of items before the recommendation algorithm be able to provide reliable and accurate recommendations.

#### *2.2. Technique For Order Of Preference By Similarity To Ideal Solution (TOPSIS)*

A Multi-Criteria Decision Making (MCDM) problem is concisely expressed in a matrix format, in which columns indicate criteria (attributes) considered in a given problem; and in which rows list the competing alternatives.

Specifically in this context, a MCDM problem with  $m$  alternatives ( $A_1, A_2, \dots, A_m$ ) that are evaluated by  $n$  criteria ( $C_1, C_2, \dots, C_n$ ) is viewed as a geometric system with  $m$  points in  $n$ -dimensional space. An element  $x_{ij}$  of the matrix indicates the performance rating of the  $i^{\text{th}}$  alternative  $A_i$ , with respect to the  $j^{\text{th}}$  criterion  $C_j$ .

Hwang and Yoon [11] introduced the TOPSIS method based on the idea that the best alternative should have the shortest distance from the positive ideal solution and farthest distance from the negative ideal solution. TOPSIS method is a multi-attribute decision making approach and stands for technique for ordering preference by similarity to ideal solution [8], [9]. They assumed that if each criterion is monotonously increasing or decreasing, then it is easy to define an ideal solution. Such a solution comprises all the best achievable values of the criteria, while the worst solution is composed of all the worst criteria values achievable, the TOPSIS solution method consists of the following steps [10]:

1) Normalizing the decision matrix

The normalization of the decision matrix is done using the following transformation, for each  $x_{ij}$ .

$$n_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^m x_{ij}^2}}, i = 1, \dots, m; j = 1, \dots, n. \quad (1)$$

2) Constructing the normalized weighted decision

The columns of the normalized decision matrix are multiplied by the associated weights as follows

$$v_{ij} = w_j \cdot n_{ij}, i = 1, 2, \dots, m; j = 1, 2, \dots, n \quad (2)$$

, where  $w_j$  represents the weight of  $j^{\text{th}}$  criterion,

$$\text{And } \sum_{j=1}^n w_j = 1.$$

3) Determining the positive and negative ideal solutions

The positive and negative ideal value sets are determined, respectively, as follows

$$A^+ = (v_1^+, v_2^+, \dots, v_n^+) \\ = \left\{ \left( \max_j v_{ij} \mid j \in \Omega_b \right), \left( \min_j v_{ij} \mid j \in \Omega_c \right) \right\}, \quad (3)$$

$$A^- = (v_1^-, v_2^-, \dots, v_n^-) \\ = \left\{ \left( \min_j v_{ij} \mid j \in \Omega_b \right), \left( \max_j v_{ij} \mid j \in \Omega_c \right) \right\} \quad (4)$$

4) Determining the distance from ideal solutions

Two Euclidean distances for each alternative are calculated as follows:

$$S_i^+ = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^+)^2}, i = 1, 2, \dots, m, \quad (5)$$

$$S_i^- = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^-)^2}, i = 1, 2, \dots, m \quad (6)$$

Where  $S_i^+$  and  $S_i^-$  represents the distance of alternative  $A_i$  from the positive and negative ideal solutions, respectively.

5) Calculating the relative closeness to the ideal solution

The relative closeness to the ideal solution is defined as follows

$$RC_i = \frac{S_i^-}{S_i^+ + S_i^-}, i=1,2,\dots,m, 0 \leq RC_i \leq 1. \tag{7}$$

Where  $RC_i$  represents the relative closeness.

6) Ranking the alternatives

Alternatives must be ranked based on  $RC_i$  in which the highest score is the best alternative.

2.3. Information Entropy Weight Method

Entropy [11] is the measure of inter user similarity that exists during recommendation generation process. It is expressed in terms of discrete set of probabilities as given in Eq 8.

$$H(D(U_t, U_x)) = - \sum_{i=1}^n p(d_i) \log_2 p(d_i) \tag{8}$$

where,  $D(U_t, U_x)$  is the difference score rating between the target user  $U_t$  and user  $U_x$  for  $n$  items and  $p(d_i)$  is the probability density function of different score rating.

These probabilities depict the degree to which the target user  $U_t$  is similar to user  $U_x$ . Lower the entropy, higher the degree of inter user similarity.

The weight of the criterion reflects its importance in MCDM. In this paper, an objective weight is applied; named Information Entropy Weight (IEW) based on the information entropy of raw data [13]. Range standardization was done to transform different scales and units among various criteria into common measurable units in order to compare their weights.

$$x'_{ij} = \frac{x_{ij} - \min_{1 \leq j \leq n} x_{ij}}{\max_{1 \leq j \leq n} x_{ij} - \min_{1 \leq j \leq n} x_{ij}} \tag{9}$$

$D'(x')$  $_{m \times n}$  is the matrix after range standardization;  $\max x_{ij}$ ,  $\min x_{ij}$  are the maximum and the minimum values of the criterion ( $j$ ) respectively, all values in  $D'$  are ( $0 \leq x'_{ij} \leq 1$ ). According to the normalized matrix  $D'=(x')$  $_{m \times n}$  the information entropy is calculated as shown in the following steps, first in order to avoid the insignificance of  $\ln f_{ij}$  in Eq. (11)  $f_{ij}$  is stipulated as shown in Eq. (10):

$$f_{ij} = \frac{1 + x'_{ij}}{\sum_{i=1}^m (1 + x'_{ij})} \tag{10}$$

$$H_j = - \left( \sum_{i=1}^m f_{ij} \ln f_{ij} \right) i=1,2,\dots,m; j=1,2,\dots,n \tag{11}$$

After calculating the various degrees ( $H_j$ ), the deviation degree of the criterion ( $j$ ) noted by ( $G_j$ ) is computed as in Eq. (12):

$$G_j = 1 - H_j, j=1,2,\dots,n \tag{12}$$

( $G_j$ ) is greater if the value of ( $H_j$ ) is smaller consequently, if the ( $G_j$ ) is higher, the information entropy ( $H_j$ ) is lower, which indicates that the more the information criterion ( $j$ ) provides the greater weight given to the criterion ( $j$ ).

The weight ( $w_j$ ) of the criterion ( $j$ ) is defined as:

$$w_j = \frac{G_j}{\sum_{j=1}^n G_j} = \frac{1 - H_j}{n - \sum_{j=1}^n H_j} \tag{13}$$

Where  $j = 1, 2, \dots, n$ .

**3. Recommender**

Recommender systems provide the user with a list of recommended items they might prefer, or supply guesses of how much the user might prefer each item [8], [9].

As the mathematical model,  $S = \{s_1, s_2, \dots, s_m\}$  is defined as the vector of the service information and  $F = \{f_1, f_2, \dots, f_n\}$  is defined as the vector of the requirement's contextual features. To represent the relevance performance of the service  $s_i$  in the quantitative feature  $i$ , the decision matrix is constructed as the following:

$$D = \begin{bmatrix} d_{11} & d_{12} & \dots & d_{1n} \\ d_{21} & d_{22} & \dots & d_{2n} \\ \dots & \dots & \dots & \dots \\ d_{m1} & d_{m2} & \dots & d_{mn} \end{bmatrix} \tag{14}$$

The decision matrix is normalized following the formula:

$$b_{ij} = \frac{d_{ij}}{\sum_{j=1}^n d_{ij}^2}, i = 1, 2, \dots, m; j = 1, 2, \dots, n \tag{15}$$

The normalized value  $b_{ij}$  is limited in [0,1]. The utility value of the service  $s_j$  is calculated using the formula:

$$RC_i = \frac{t_i^-}{t_i^- + t_i^+}, i = 1, 2, \dots, m \tag{16}$$

where,

$$t_i^+ = \sqrt{\sum_{j=1}^n (c_{ij} - c_j^+)}, i = 1, 2, \dots, m \tag{17}$$

$$t_i^- = \sqrt{\sum_{j=1}^n (c_{ij} - c_j^-)}, i = 1, 2, \dots, m \tag{18}$$

In the above equations,  $n$  is the number of requirement's contextual features,  $r_{ij}$  is the weighted normalized decision matrix which is calculated by

$$r_{ij} = w_j b_{ij}, i = 1, 2, \dots, m, j = 1, 2, \dots, n \tag{19}$$

where  $w_j$  means the requirement's relative need in this feature and  $r_j^+, r_j^-$  are the positive and negative ideal solutions:

$$R^+ = \{r_1^+, r_2^+, \dots, r_n^+\} = \left\{ \left( \max_i r_{ij} \mid j \in I \right), \left( \min_i r_{ij} \mid j \in J \right) \right\} \quad (20)$$

$$R^- = \{r_1^-, r_2^-, \dots, r_n^-\} = \left\{ \left( \min_i r_{ij} \mid j \in I \right), \left( \max_i r_{ij} \mid j \in J \right) \right\} \quad (21)$$

The more increase the relative closeness  $RC_i$ , the more important the utility value of the service  $s_i$ . Finally, by performing the three stages systematically, the algorithm recommends a ranked list with the highest weighted target instances and the requirement obtains the most suitable services.

**4. Service Selection Problem Based On IT Governance Requirements**

The minimum requirements for its application in the ITG context are as follows Table I:

ITG Service Attribute A	1.5
ITG Service Attribute B	1900
ITG Service Attribute C	20000
ITG Service Attribute D	5.0
ITG Service Attribute E	3
ITG Service Attribute F	7

Table 1: Minimum Requirements

Attributes for the short-listed candidate services are shown in Table II:

Alt.	A	B	C	D	E	F
A <sub>1</sub>	2.0	1500	20000	5.5	5	9
A <sub>2</sub>	2.5	2700	18000	6.5	3	5
A <sub>3</sub>	1.8	2000	21000	4.5	7	7
A <sub>4</sub>	2.2	1800	20000	5.0	5	5

Table 2: Attributes For the Candidate Services

**4.1. Calculating The Normalized Decision Matrix**

The normalized decision matrix is calculated with Eq. 22

$$r_{ij} = \frac{d_{ij}}{\sqrt{\sum_{i=1}^m d_{ij}^2}} \quad (22)$$

$$N = \begin{bmatrix} 0.4671 & 0.3662 & 0.5056 & 0.5063 & 0.4811 & 0.6708 \\ 0.5839 & 0.6591 & 0.4550 & 0.5983 & 0.2887 & 0.3727 \\ 0.4204 & 0.4882 & 0.5308 & 0.4143 & 0.6736 & 0.5217 \\ 0.5139 & 0.4392 & 0.5056 & 0.4603 & 0.4811 & 0.3727 \end{bmatrix} \quad (23)$$

**4.2. Assign Weights For Each Attribute**

Assign weights for each attribute such that their sum will be equal one.

$$\sum_{i=1}^n w_i = 1 \quad (24)$$

$$w_1 + w_2 + w_3 + w_4 + w_5 + w_6 = 1 \quad (25)$$

<b>w<sub>1</sub></b> =	<b>w<sub>2</sub></b> =	<b>w<sub>3</sub></b> =	<b>w<sub>4</sub></b> =	<b>w<sub>5</sub></b> =	<b>w<sub>6</sub></b> =
<b>0.2</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.2</b>	<b>0.3</b>

Table 3: Weights for Each Attribute

The weights for each attribute are stored in a vector.

$$W = \begin{bmatrix} 0.2 \\ 0.1 \\ 0.1 \\ 0.1 \\ 0.2 \\ 0.3 \end{bmatrix} \tag{26}$$

Calculating the weighted normalized specification matrix.

Relative importance of the attributes with their normalized value is used to create unique parameter for the candidate service.

$$V_{ij} = N_{ij} W_i \tag{27}$$

$$V_{ij} = \begin{bmatrix} 0.0934 & 0.0366 & 0.0506 & 0.0506 & 0.0962 & 0.2012 \\ 0.1168 & 0.0659 & 0.0455 & 0.0598 & 0.0577 & 0.1118 \\ 0.0841 & 0.0488 & 0.0531 & 0.0414 & 0.1347 & 0.1565 \\ 0.1028 & 0.0439 & 0.0506 & 0.0460 & 0.0962 & 0.1118 \end{bmatrix} \tag{28}$$

4.3. Obtain The Ideal (V\*) And The Negative Ideal (V-) Solutions From The Weighted Decision Matrix V

The weighted normalized attributes for the +ve and -ve benchmark are obtained as

$$V^* = [0.1168 \ 0.0659 \ 0.0531 \ 0.0414 \ 0.1347 \ 0.2012] \tag{29}$$

$$V^- = [0.0841 \ 0.0366 \ 0.0455 \ 0.0598 \ 0.0577 \ 0.1118] \tag{30}$$

4.4. Compute The Separation Measures

Compute the separation measures from the ideal (Si\*) and the negative ideal (Si-) solutions for all alternatives, i = 1, ..., m.

$$Si^* = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^*)^2} \tag{31}$$

$$Si^- = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^-)^2} \tag{32}$$

Ideal solution	Ideal solution
$S_1^* = 0.0545$	$S_1^- = 0.0983$
$S_2^* = 0.1197$	$S_2^- = 0.0439$
$S_3^* = 0.0580$	$S_3^- = 0.0920$
$S_4^* = 0.1009$	$S_4^- = 0.0458$

Table 4: Values of Separation Measures

4.5. Determine Relative Closeness To Ideal Solution

For each alternative determine the relative closeness to the ideal solution  $(C_i^*, i = 1, \dots, m)$  as

$$C_i^* = \frac{S_i^-}{(S_i^* + S_i^-)} \tag{33}$$

Relative closeness values

- $C_1^* = 0.643$
- $C_2^* = 0.268$
- $C_3^* = 0.613$
- $C_4^* = 0.312$

The closeness rating is a number between 0 and 1, with 0 being the worst possible and 1 the best possible solution.

4.6. Rank The Preference Order

Determine the preference order by arranging the alternatives in the descending order of  $C_i^*, i = 1, \dots, m$ .

The ranks for the service alternatives in the requirement selection problem emerge as A1, A3, A4, A2.

5. Evaluation

5.1. Data Set

The experimental data comes from an in-house IT Governance recommendation system based on ITG components (see <http://www.itg-components.com>) named

ITG Service Recommendation System (ITGRS).

The ITGRS database currently consists of 2068 ratings provided by 114 requirements to 641 services, which belong to at least 1 of 21 categories in the context of ITG.

The lowest level of sparsity for the tests is defined as

$$114 \times 641 - \frac{2068}{114} \times 641 \cong 0.9717 \tag{34}$$

5.2. Coverage Metric

Coverage is a measure of the percentage of items for which the recommendation system provides predictions. A basic coverage metric is the percentage of items to which predictions are available. Coverage is reduced by defining small neighborhood sizes or by sampling users to compute predictions.

5.3. Accuracy Metrics

The performance of recommender systems is often evaluated by the predictive accuracy and classification accuracy [12]. They are divided into two main categories: statistical accuracy and decision-support accuracy metrics.

Statistical accuracy metrics evaluate the accuracy of a prediction algorithm by comparing the numerical deviation of the predicted ratings from the respective actual user ratings. Frequently used are mean absolute error (MAE), root mean squared error (RMSE) and correlation between ratings and predictions [6].

MAE is used to evaluate the effectiveness of the approach. It measures the average absolute deviation between the predicted a predicted rating and the true rating is given by:

$$MAE = \frac{\sum_{\{u,i\}} |p_{u,i} - r_{u,i}|}{n} \quad (35)$$

Where  $p_{u,i}$  the predicted rating for user  $u$  on item  $i$ .  $r_{u,i}$  is the actual rating and  $n$  is the total number of rating. The lower the MAE, the more accurate the predictions would be, allowing for better recommendations to be formulated.

The MAE has two advantages: (1) Easy to calculate, easy to understand; (2) The evaluation standard is explicit and easy to evaluate the performance of different algorithms.

In Table V the comparison for a random recommender and the approach developed in this research article is presented. R is the random selection of recommendations and A is the approach developed in this research paper.

	0.972	0.975	0.98	0.985	0.99	0.995	0.999
R	3.166	3.515	3.414	3.024	3.256	3.174	3.398
A	0.838	0.915	1.065	1.142	1.284	1.626	1.662

Table 5: Statistical Accuracy Of Different Prediction Algorithms In Terms Of Mean Absolute Error (MAE) With Respect To Different Sparsity Levels

## 6. Conclusion

The typical MCDM approaches focus on a set of feasible alternatives and considers more than one criterion to determine a priority ranking for alternative information. The main purpose of this paper is to develop a TOPSIS method to select services appropriately bases on requirements for an ITG environment from available alternatives. The problem has been described as a multi-decision making method with the focus on (dynamic) service selection. A practical experiment was presented to valid its applicability.

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## The Impact of Animated Spokesperson: Implication to the Marketers- An Indian Perspective

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### **Abstract:**

*Purpose-The main purpose of the article is to find out the impact of animated spokesperson on customer orientation. Objective of study-The main objective of study was as follows: a) to find out the impact of animated spokesperson on products and services, b) Impact of animated spokesperson on expertise c) consideration to be kept in mind while choosing animated spokesperson. Data collection-data is collected from 200 respondents which were divided into three categories i.e. children in the age group 8-10 years of age, 21-25 years of age and 25 and above. Data was collected through written questionnaire method and personal interview method. Data analysis-Multivariate and univariate tools are used for analysis. Managerial implication-The study is of great use to the marketers in understanding the impact of animated spokesperson and how to make the best use of animated spokesperson.*

**Key words:** *animated spokesperson, customer orientation, expertise*

### **1. Introduction**

The use of celebrity to promote a product or service is quite old. Celebrity endorsement is used as an important tool for promoting a particular product or service. In India where celebrities are considered as hero worshippers the strategy of using celebrities is quite effective. One diversification in celebrity endorsement is the use of animated spokesperson to promote a particular product or service. Animated spokesperson is considered as most of the interesting and effective weapon for creating brand awareness about a particular product or service. Previously animated spokesperson were considered as “retarded brothers” but later on things were on a positive note once it was thought that animated spokesperson can actually take you if not further than live action.

The use of animated spokesperson over celebrity endorsement brings about the following benefits.

- 1) It is more effective and attractive.
- 2) It brings about a strong brand association.
- 3) It is acceptable by most of the age groups.

Recently, companies are using different types of animals, human beings and virtual patterns like objects to speak for their products and services in different characters.

Many researchers have proved that using an animated spokesperson over a spokesperson is better because they tend to create a unique brand association and secondly they have a long lasting impact in the minds of the consumers. Using animate spokesperson reduces the distance between companies and brand and develops a strong brand association resulting in purchase decision. Another major advantage of using an animated spokesperson is the reduction of the cost aspect. The use of animated spokesperson is not limited to a particular time period but can be used indefinitely.

### **2. Review of Literature**

Callout and Lee (1994) conducted an analysis to examine the effect of animation and animated spokesperson on television advertising. Findings indicate that animated spokesperson is being used more often for high involvement products.

Walt and Wheeler (2009) also conducted a study to check the attitude of respondents with regard to three parameters drawn from Ohanian scale between celebrity endorsement and created spokesperson. Results of the study show that with regard to first two parameters i.e. trustworthiness and expertise celebrity endorsers and created spokesperson stand on the same level. However, with regard to attractiveness parameter Celebrity endorsers seem to be more attractive than the created spokesperson.

Horsier Sorbet and Seirra.J.Jermy and Torres.M.Ivonne (2008) made use of distinctiveness theory in order to compare the effectiveness between cartoon spokesperson and celebrity endorsements in print ads for attitude towards ad, attitude towards brand

and purchase intention. Results of the study show that in print ads cartoon spokesperson are better than celebrity endorsers with regard to attitude towards ad, attitude towards brand and purchase intention.

Huang et al (2011) conducted a study on animated spokesperson. Advertisement and communication effects and purchase decision. The study was conducted in two stages; the first stage comprised of selecting a representative spokesperson and the second stage comprised of filling a questionnaire consisting of 32 questions.

Mcgoldrick et al (2006) conducted a research on screen characters. The main aim of the research is to measure the degree of appropriateness of on screen characters. The study was conducted by creating a website for online book sellers and included respondents from 183 countries. The results indicate that human characters are more appealing than other characters. They appear to be more likeable, appropriate and trustworthy. However, the studies also revealed the possibilities of mismatch which might take place between expectation and capabilities of human characters.

### 3. Data Collection

Data is collected from 200 respondents divided into different age categories. The respondent's category varied according to age. The data collection was done in two stages. First, some well known animated spokesperson ad were selected on the basis of random sampling method. Then, the respondents were shown some advertisements of these animated spokesperson on the basis of which they were asked to answer some questions on five point likert scales. However, for children personal interview was taken. Children in the age group 8-10 years of age were taken. Effect of animated spokesperson was divided into three parts i.e. effect of animated spokesperson on products, effect of animated spokesperson on expertise and consideration using animated spokesperson. Each of the research variables included questions like do the love for animated spokes characters trigger purchase intention? Do the image of animated spokesperson affect the views of the product or corporate and do the peripheral products the corporate develop trigger purchase? For second research variable effect of animated spokes characters on high involvement products questions like will you use a product? As a corporate owner what kind of animated spokes character you will use were for which animated spokes characters speak for? For the third research variable questions like if you are.....? These variables were tested against some background variables like, age. Before actual study pilot study was done which revealed that most of the question should be close-ended.

### 4. Data Analysis

Data is analyzed using SPSS software. The result of the analysis is as follows:

In order to test the reliability of data Cronbach Alpha score was calculated the variables were divided into three categories i.e. effect of animated spokesperson on products and services, effect of animated spokesperson on expertise and consideration to be kept in mind while choosing an animated spokesperson. The reliability scores were as follows.

Parameters	Cronbach Alpha
Effect of animated spokesperson on products and services	.642
Effect of animated spokesperson on expertise	.430
Consideration to be kept in mind while choosing an animated spokesperson	.447

*Table 1: Showing the Reliability Scores of Various Variables*

Respondents in the age category 8-10

For this age group personal interview as done and it was found that the variable animated spokesperson influences the desire for products and services and effectiveness of the animated spokesperson plays a very important role in influencing purchase decision.

Respondents in the age category 21-25

Descriptive were performed for all the age category and it was found that in case of impact of animated person spokesperson on products and services, consumers seem to be influenced more by the variable animated spokesperson influences the desire for products and services.(mean=8.71 and S.D=4.723)In case of the role of animated spokesperson on expertise the respondents believe that animated spokesperson help in comparison of different competing brands (Mean=4.05 and S.D=.99). For consideration to be kept in mind while selecting the animated spokesperson the variable the effective ness of animated spokesperson occupies maximum importance(Mean=3.6582 and S.D=1.05)

Respondents in the age category 25 and above

Descriptive analysis was done and it was found out that in case of the impact of animated spokesperson on the products and services it was found that the variable animated spokesperson increases brand awareness and brand recall (mean=6.75 and S.D=2.7). In case of role of animated spokesperson on expertise the variable animated spokesperson increases authenticity has the highest mean(mean=4.52 and S.D=.5).For the third category consideration to be kept in mind while choosing an animated spokesperson the variable character chosen should match with the variable (mean=3.55,SD=2.7)

### 5. Managerial Implications And Scope For Future Research

The study is of great use to the marketers in deciding the selection of animated spokesperson. It will also help marketers to decide what type of animated spokesperson to use in order to draw the best of sales over the counter. There is lot of scope for future studies by taking a wider sample and more variables brought under study.

### 6. Limitations

The main limitation of the study is limited sample size and only limited no of respondents chosen for study.

### 7. Conclusion

Therefore, we can say that animated spokesperson has an important impact on the various age groups and their use must be so designed so that it brings about maximum effectiveness across all age groups. The type of animated spokesperson used will differ according to the nature and the type of products and services.

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## Technological Revolution and Its Implication on Customer Value Perception: A Study on Indian Banking Sector

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### **Abstract:**

*To-day, we cannot think about the success of a banking system without technological revolution. It has enlarged the role of banking sector in the economy. The banks with the latest technology and techniques are able to generate more and more business resulting in their greater profitability. In recent studies, customer perceived value has come up strongly as the basis of competitive advantage in the banking industry. Against this background, this study finds out the implication of technological revolution on customer's value perception in Indian banking sector.*

**Key words:** *Technology, technological revolution, Perceived Value, Banking sector*

### **1. Introduction**

The Indian banking sector has been evolving since the year 1770 when the Bank of Hindustan was established in Calcutta and subsequently in its various avatars-when the General Bank of India, which came into existence in 1886 again in Calcutta; and then Bank of Calcutta (later Bank of Bengal - 1806), Bank of Bombay and Bank of Madras merging in 1921 to become the Imperial Bank of India which became the State Bank of India in 1955.

The Indian banking system saw another phase of metamorphosis in 1969 when all the leading commercial banks were nationalised by the then prime minister, Indira Gandhi. The third phase which actually started changing the face of the Indian banking was the post-1991 economic liberalisation which opened up the banking sector to increased competition and transformation offering better fare to customers. In this era, Banks have changed in their operations and moved towards universal banking along with the increased usage of technology.

Technology in the banks is presently catching up with a high level of development around the world. The gaps between the Indian banks and their counterparts in the technologically advanced countries are gradually narrowing down. The world has witnessed an information and technological revolution of late. This revolution has touched every aspect of public life including banking sector (Siam, 2006). Over the past two decades in particular, the banking industry has invested substantial resources in bringing technology to customers. It has revolutionised every industry including banking in the world by rendering faster and cost effective delivery of products and services to the customers. According to Chakrabarty, (2007) core banking solution enables banks to extend the full benefits of ATM, tele-banking, mobile banking, internet banking, card banking and other multiple delivery channels to all customers allowing banks to offer a multitude of customer-centric services on a 24x7 basis from a single location, supporting retail as well as corporate banking activities. Today public sector and private sector banks are offering online banking services. Various alternative channels to provide easy and anywhere banking are properly thought of. The banks in India are using technology not only to improve their own internal processes but also to increase facilities and services for their customers' satisfaction. Actual manifestation of the state of satisfaction will vary from person to person depending on their value perception. There may be some possibilities of gaps between customer's expectations and actual service perception in technology based banking service, which may lead to customer dissatisfaction. Hence, there is a need to assess the impact of technological revolution on behavioral intention of customers in terms of their value perception in Indian context.

### **2. Literature Review**

Avasthi & Sharma (2000-01) have analyzed in their study that advances in technology are set to change the face of banking business. Technology has transformed the delivery channels by banks in retail banking. Hua G. (2009) investigates the online banking acceptance in China by conducting an experiment to investigate how users' perception about online banking is affected by the perceived ease of use. The study finds that both perceived ease of use and privacy policy have a significant impact on user's adoption

of online banking. Jalan, B. (2003), IT revolution has brought about a fundamental transformation in banking industry. Perhaps no other sector has been affected by advances in technology as much as banking & finance.

Kotler and Keller (2006) define customer perceived value as “the difference between the prospective customer’s evaluation of all the benefits and all the cost of an offering and the perceived alternatives”.

Woodruff’s (1997) definition is best suited for the present study. He defines customer value as a customer’s perceived preference for and evaluation of those attributes, attributes performances and consequences arising from use that facilitate (or block) achieving the customers goals and purposes in use situations. According to him, the use situation of a product plays critical role in the evaluation of desires, so that when the situation changes, the evaluation of consequences, goals and purposes change as well.

Woodruff’s (1997) means-end-based customer value hierarchy model consists of three levels, all of which contribute to customer’s perceived value. The first of these is a goal or purpose level and consists of value perceptions relating to achieving subjective goals like ease of mind, increase in self-esteem, enjoyable and problem free use experience, and overall effectiveness. The second is a consequence or benefit level, and concerns more concrete and more articulate benefits that customer strive to attain with their offering, such as no hassle, reliability, ease of use, time saving, desired visual view, independence of time, high cost quality ratio and so on. The third is an attribute or attribute performance level value; this is the most concrete and basic level value constructs that dealing with the direct functions and characteristics of the offering

### 3. Objectives

This study has been framed with following objectives:

- To explore the factors affecting the overall value perception of a customer.
- To access the impact of each and every factors on the overall value perception of a customer

### 4. Methodology

#### 4.1. Data Source

This study is mainly based on the primary data. Secondary data is only used for the development of the research framework. A structured questionnaire is used as the main tool for data collection about the consumer’s perception regarding the impact of technological revolution in indian banking sector.

#### 4.2. Sampling Plan

This study includes 182 sample respondents residing in Urban communities of Odisha. Sample respondents are selected using simple random sampling method for this study during May 2013.

#### 4.3. Questionnaire Design

A questionnaire was used to collect the data from the sample respondents. The questionnaires were administered by courier, e-mail, and personal delivery. A five-point Likert scale was used to elicit responses to the questionnaire indicating their level of agreement (1= strongly disagree to 5= strongly agree). The questionnaire also contained questions to solicit demographic information of the respondents. The questionnaire is pretested and revised through back translation process for minor change in wordings.

#### 4.4. Tests Used For Data Analysis

SPSS (Statistical Package for Social Sciences) version 20.0 is used to compute and analyze the data. The statistical tests used in the analysis of data included descriptive statistics, factor analysis, and regression analysis.

#### 4.5. Empirical Findings

##### 4.5.1. Demographic Profile Of The Respondents

Selected demographic characteristics of the sample (n=182) including gender, age, educational qualification and occupation are presented in table-1 as below.

Variable		Frequency	Percentage
Gender	Male	134	73.7
	Female	48	26.3
<b>Total</b>		<b>182</b>	<b>100</b>
Age	Below 25	38	20.9
	25-35	67	36.8
	36-50	58	31.8
	51-60	19	10.5
<b>Total</b>		<b>182</b>	<b>100</b>

Variable		Frequency	Percentage
Occupation	Salaried/Pensioner	58	31.8
	Self employed	51	28.1
	Professional	45	24.7
	Student	28	15.4
<b>Total</b>		<b>182</b>	<b>100</b>
Qualification	HSC	18	9.9
	Intermediate	26	14.3
	Graduate	76	41.7
	Post graduate	62	34.1
<b>Total</b>		<b>182</b>	<b>100</b>

Table 1: Demographic Profile of the Respondents  
Source: Field Work

It can be revealed from the data presented in table-1 that out of total 182 numbers of respondents 134 (73.7%) are male and rest 48 (26.3%) are female. In terms of age group, highest 67 (36.8%) number of respondents belong to the age group of 25-35, followed by 58 (31.8) belong to the age group of 36-50, 38 (20.9%) belong to the age group of below 25 and only 19 (10.5%) belong to the age group of 51-60. Likewise occupation wise classification reveals that highest 58 (31.8%) number of respondents are Salaried/Pensioner, followed by 51 (28.1%) are self employed, 45 (24.7%) are professional and only 28 (15.4%) are student. Finally in terms of educational qualification, out of total 182 numbers of respondents, 76 (41.7%) are graduates, 62 (34.1%) are post graduates, 26 (14.3%) are intermediates and only 18 (9.9%) are qualified up to HSC level.

#### 4.6. Factor Analysis

In the present study factor analysis is used to reduce the number of variable into definite number of factors associated with Customers value perception with technological revolution. The factor analysis is performed using principal component extraction method with Varimax rotation.

#### 4.7. Sampling Adequacy

In order to establish the strength of factor analysis, the sampling adequacy is checked using Kaiser-Meyer-Olkin (KMO) test and the results are presented in the table-2 given as below.

Kaiser-Meyer-Olkin Measure Of Sampling Adequacy		.710
Bartlett's Test of Sphericity	Approx. Chi-Square	223.427
	df	45
	Sig.	.001

Table 2: KMO and Bartlett's Test

From table-2 it is found that the value of KMO statistics is greater than 0.5, indicating that factor analysis can be employed for the given set of data. As the p value as computed is 0.001, it supports the validity of the factor analysis.

For further investigation, three factors having eigen value greater than one are extracted. Table -3 gives the factor loading of the variables under each of the three extracted factors. In order to interpret the results, a cut-off point of 0.5 is decided for each variable to group them into factors by forming a rotated component matrix.

	Component		
	Consequence	Goal	Attribute
Technological revolution gives me an enjoyable banking experience	-.146	.662	-.056
Technological revolution enables trouble free transaction with banks	.758	-.014	-.048
Technological revolution makes banking independent of time	.203	.700	.058
Technological revolution makes banking operations easier than earlier	.773	-.030	-.073
Technological revolution makes banking independent of location	.070	.822	-.072
Technological revolution makes banking functions smooth and hassle free	.831	.056	.232
Technological revolution brings a good functional lay out for banking transaction	.741	.062	.024
Technological revolution makes banking transactions economically sound	.393	.046	.618
Technological revolution enhances the service quality of the banking transaction	-.236	-.134	.807
Technological revolution makes banking transaction highly reliable than earlier	-.424	.435	.594

*Table 3: Rotated Component Matrix*

*Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization  
Rotation Converged In 4 Iterations*

The first factor  $F_1$  having four significant factor loadings can be named as customers' "Consequence level Value" as it includes, 'Technological revolution enables trouble free transaction with banks (0.758)', 'Technological revolution makes banking operations easier than earlier (0.773)', 'Technological revolution makes banking functions smooth and hassle free (0.831)' and 'Technological revolution brings a good functional lay out for banking transaction (0.741)'. The second factor  $F_2$  having three significant factor loadings can be named as "Goal level value" as it includes, 'Technological revolution gives an enjoyable banking experience (0.662)', 'Technological revolution makes banking independent of time (0.700)' and 'Technological revolution makes banking independent of location (0.822)'. The third factor  $F_3$  having three significant factor loadings stands for "Attribute level value" as it includes 'Technological revolution makes banking transactions economically sound (0.618)', 'Technological revolution enhances the service quality of the banking transaction (0.807)' and 'Technological revolution makes banking transaction highly reliable than earlier (0.594)'.

After identifying the factors associated with perceived value of customers, multiple regression analysis is used to assess the impact of each factor on the overall value perception of the customer. Here overall value perception of customer with technological revolution is the dependent variable and customer's consequence, goal and attribute level value are the independent variables.

## 5. Result Of Multiple Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error
1	.928 <sup>a</sup>	.860	.849	.69921

*Table 4: Model Summary*

*A. Predictors: (Constant), Consequence Level Value, Attribute Level Value, Goal Level Value.*

The overall predictability of the model is shown in table-4 where the adjusted  $R^2$  value of 0.849 indicates that 85% of the factors are affecting the customer's overall value perception with respect to Technological revolution with commercial banks in India.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	108.375	3	36.125	73.891	.000 <sup>b</sup>
	Residual	17.600	36	.489		
	Total	125.975	39			

Table 5: Anova<sup>a</sup>

A. Dependent Variable: Overall Value Perception

B. Predictors: (Constant), Consequence Level Value, Attribute Level Value, Goal Level Value

From the ANOVA test it can be predicted that the table Sig. value of 0.05 is greater than the calculated Sig. value of 0.000. it means that there is a significant correlation between the dependent and independent variables i.e., customer's overall value perception with respect to Consequence level Value, Attribute level Value and Goal level Value of a customer.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.733	.301		2.436	.020
	Consequence level Value	.295	.103	.284	2.865	.007
	Goal level Value	.170	.103	.198	1.655	.107
	Attribute level Value	.548	.118	.522	4.660	.000

Table 6: Coefficients<sup>a</sup>

A. Dependent Variable: Overall Value Perception

Coefficient analysis presented in Table-6 shows the relationship between dependent and independent variables. According to calculated Sig. value, all the factors namely Consequence level Value and Attribute level Value except Goal level Value have significant relationship with customer's overall value perception towards technological revolution with commercial banks in India as the table sig. value of 0.05 is greater than the calculated sig values.

## 6. Conclusion

From the statistical analysis it is observed that there is a relation between overall value perception of customer and Consequence level Value and Attribute level Value, except Goal level Value associated with technological revolution in commercial banks in India. Further it is also revealed that 100% change in Attribute level value will lead to 54.8% change in customer's overall value perception and 100% change in Consequence level Value will lead to 29.5% change in customer's overall value perception with technological revolution in commercial banks in In India.

## 7. Limitation

There are some limitations for conducting this research are given below:

- This study is restricted to the view of 182 respondents residing in urban areas of Orissa.
- Customers' value perception towards any particular bank has not been dictated.

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## **Comparative Analysis of Reported and Inflated Financial Ratio**

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### **Abstract:**

*Inflation is a rise in the general level of prices of goods and services in an economy over a period of time. This study investigates the impact of inflation on companies' financial performance and financial position by evaluating and comparing reported and inflated financial ratios. Financial statements of 42 manufacturing companies covering 7 industrial sectors have been restated in current purchasing power for a period of 5 years (2004-05 to 2008-09). The ratios were calculated on both historical and adjusted financial statements to form two sets of ratios. The Current Purchasing Power method and Financial Ratio analysis have been employed to study the impact of inflation on different financial ratios. This study offered valuable information and results showed that with the impact of inflation there is significant difference in liquidity, profitability and activity ratios except quick ratio.*

**Key words:** Manufacturing Firms, Financial Ratios, Inflation, Statistical Analysis

### **1. Introduction**

Inflation refers to a continuous rise in general price level which reduces the value of money or purchasing power over a period of time. Regardless of that, the effects of inflation on the financial performance of economic units go unrecognized in published financial statements. The primary purpose of the financial statements of a company is to give a true and fair picture of financial performance (i.e. profit or loss) of the company for a particular period and financial position (assets and liabilities) of the company for a particular point of time. The impact of inflation comes in the form of rising prices and the financial statements are prepared on Historical cost basis, so they don't take into consideration of rise in the price level on different items of financial statements. This may sometimes result into the overstated profits, underpriced assets and misleading picture of Business etc. So, the financial statements presented under historical cost based accounting generally do not reflect the current worth of business. This deprives the different stakeholders like management, shareholders, and creditors etc. to have a right picture of business to make appropriate decisions.

Therefore, historical cost based accounting information about the operations of companies has ignored the effects of inflation. But the users of financial information, need relevant and reliable information about the financial position, performance and changes in the financial position of firms for making economic decisions. Inflation, on the other hand, distorts financial information by creating an impact on the firm's operational and financial results. In a hyperinflationary economy, reporting of operating results and financial position without restatement is misleading and thus is not useful. Therefore, it is necessary that financial statements reflect the true picture and are free from the negative effects of inflation.

Even though inflation accounting has long been debated, a necessary attention is avoided to provide its effects on financial statements of businesses. Hence, this study involves the impact of inflation on different financial ratios as well as a comparative study of reported and inflated financial ratios. For the purpose, 10 ratios categorized under three groups are analyzed.

### **2. Literature Review**

Gupta Ramesh and Bhandari L C (1978), in the article "Impact of Inflation Accounting on Corporate Profits - A Study of 57 Indian Companies" mention that the whether accountants should be required to adjust reported income for inflation. The objective of this article is to measure the impact of inflation on reported profits and relevant financial ratios. The earnings of 57 companies covering 9 industries have been restated for a period of 7 years (1970-1976). The results emphasize the differential effects on companies with varying inflation rates with general price level adjustments and the significance of monetary gains and losses. The effects of restatement on dividend coverage and tax burden have been suitably highlighted. D. J. Daly (1982), in the article "Inflation, Accounting and its Effect, Canadian Manufacturing, 1966-82", provides estimates of the effects of inflation in Canada on the reported

rate of return in manufacturing firms from 1966 to 1982. It provides estimates for several different concepts of rate of return (both for all assets, whether financed by equity or debt, and for the narrower equity to the owners) and for both a narrow and wide range of financial assets. Comparisons are made with similar studies for the United Kingdom.

Shalom Hochman and Oded Palmon (1985) in the article "The Impact of inflation on the Aggregate Debt-Asset Ratio" demonstrate the impact of inflation on the aggregate debt-asset ratio cannot be determined theoretically.

However, it is shown that inflation is likely to increase this ratio when personal income tax schedules are indexed to the price level and/or when leverage-related costs are relatively high and the personal tax rate on income from holding common stocks is relatively low. Whittington G., Saporta V and Ajit Singh (1997), in their working paper "The Effects of Hyper-Inflation on Accounting Ratios Financing Corporate Growth in Industrial Economies" described the hyper-inflation can have a severe distortionary effect of the pattern of corporate finance which is apparent from company accounts. A simple algorithm, based upon the method of inflation accounting applied in Brazil, is developed and applied to the accounts of Turkish listed companies for the period 1982-90. The adjusted figures give a more plausible picture of corporate profitability and growth, and this suggests that the adjustment method is substantially successful.

Ambrish Gupta (2000), in his research entitled to "Inflation Accounting- The Indian Context", this study was a modest effort towards a systematic and comprehensive analysis of various aspects for inflation accounting and looks for offering an acceptable solution to this problem in the Indian context. It also made an assessment of the its effect of inflation on the profitability plus financial position, respectively, of the corporate entities, in addition to above it attempt to make an overall review of the financial statements, through ratio analysis and funds flow analysis, in the light of inflation. This study moreover reflects effects of inflation, over sixteen years between 1983-84 to 1998-99, on the financial health of Oil India Ltd. Karapinar A. and Zaif F., (2005), in their article "Enflasyon Muhasebesinin Finansal Tablolar Analizine Etkisi, (The Effect of Inflation Accounting on Financial Statement Analysis)" In their study, Karapinar and Zaif examined the effects of inflation on accounting practice of companies' financial ratios. Their sample covered the 73 non-financial companies listed Istanbul Stock Exchange as of 2003. The ratios were calculated on both historical and adjusted numbers of financial statements to form two sets of ratios. Results showed that there was no significant change in liquidity, financial, profitability and activity ratios except fixed asset turnover ratios. Akdoğan, Aktas and Unal, in their study in 2009, extended the number of companies in the sample of Karapinar and Zaif. The results covering 146 companies were consistent with the findings of Karapinar and Zaif's study. Their results revealed that a statistically significant change for the whole sample occurs only on Total Assets Turnover. Other ratios did not show any considerable difference.

Charles N'cho-Oguee, Daniel L. Blakley, L. William Murray, and Marolee Beaumont Smith (2011), in their article "Econometric Analysis of Functional Relationship between Inflation and Growth of Firms in South Africa: Empirical Research Findings" this research is to investigate the impact inflation and other factors on the growth of business firms operating in South Africa. Data sets of South African firms' financial statements over the period of 1983-1990 were assembled to permit a detailed examination of the impact of inflation on firm's financial ratios. It has concluded that firm's debt-to-equity, sales-to-assets, and profitability ratios are all positively associated with growth and adversely affected by high inflation; a firm's working capital-to-sales ratio is negatively related to growth and is positively affected by high inflation; and there is a real, measurable impact of the financial instabilities associated with apartheid on firm's growth. Aydın Karapinar, Figen Zaifand Rıdvan Bayırlı (2012), this study investigates the impact of inflation accounting application on key financial ratios. These studies related to the financial statements of 132 companies listed in the Istanbul Stock Exchange (ISE) are studied. An analysis of paired samples t test has been conducted on the financial ratios of the companies. The results showed that a significant difference between adjusted cost based financial ratios and historical cost based financial ratios occurs only for current, ratios, equity ratios and noncurrent turnover ratios. The study offered valuable information as to analyzing companies operating in hyperinflation economies. In India serious thinking on having to adjust historical cost accounts to price level change has been rather few and far between.

### 3. Objectives of The Study

The objectives of the proposed study are to find the impact of inflation on financial performance & position through analyzing financial ratios. The objectives of the proposed study are:

- To analyse the impact of inflation on different financial ratios of manufacturing companies in India
- To study the comparison between reported and inflated financial ratios of manufacturing companies in India.

### 4. Hypotheses for the Study

To study the research problems and to attain the research objectives, a hypothesis has framed. Broadly, I have attempted to test the null hypothesis against the alternative hypothesis. The null hypothesis and the alternative hypothesis framed for the purpose are:

- Null Hypothesis ( $H_{03}$ ): There is no significant difference in between reported and inflated financial ratios.
- Alternative Hypothesis ( $H_{a3}$ ): There is a significant difference in between reported and inflated financial ratios.

### 5. Methodology and Tests Used In the Study

The work conducted is a study of 42 undertakings, selected randomly from manufacturing sectors operating in India. The companies so selected are capital intensive, where there is a heavy investment in fixed assets and inventories, profitable and following the same accounting practices throughout the period of study. These sample companies belong to different sectors, viz. Auto, Cement, Chemical, Fertilizer, Food, Petroleum and Steel.

The year-end financial statements of sample companies were used for the comparing the reported and inflated performances. The published annual reports, books, journals, web pages, etc. of the selected companies form the main sources of information. The data so collected are analyzed with the help Current Purchasing Power Method (CPP), Financial Statement Analysis (FSA) and Statistical tools such as; Average, Variance Standard Deviation, Kurtosis, Skewness, and t-test are employed too to draw meaningful conclusion. The t-test is used to compare the values of the means from two groups. The two sample of t-test has been performed because the variances of two groups are assumed to be unequal.

### 5.1. Current Purchasing Power Method

Current Purchasing Power Method of accounting requires the companies to maintain the financial statements on conventional historical cost basis, but it further requires presentation of supplementary statements in items of current purchasing power of currency at the end of the accounting period. In this method the various items of financial statements, i.e. balance sheet and profit and loss account are adjusted with the help of recognized general price index. The consumer price index or the wholesale price index prepared by the Reserve Bank of India can be taken for conversion of historical costs. However, WPI (All Commodities) is being used in this study.

### 5.2. Conversion Process

For analyzing the impact inflation on reported financial performance the Historical Cost Based (HCB) accounting, financial statements for all the years from 2004-05 to 2008-09 were converted into Accounting for Current Purchasing Power (CPP) financial statements in terms of the index number prevailing in the month of March 2009. The adjustments for inflation are based on movements in wholesale price index.

Year	Average	Average as per 2004-05	Year End	Year End as per 2004-05
2000-01	83.19	100.00	84.00	100.00
2001-02	86.18	103.59	85.48	101.76
2002-03	89.12	107.13	90.60	107.86
2003-04	93.98	112.97	94.93	113.01
2004-05	100.07	120.29	100.00	119.05
2005-06	104.50	125.62	105.70	125.83
2006-07	111.40	133.91	112.80	134.29
2007-08	116.60	140.16	121.50	144.64
2008-09	126.00	151.46	123.50	147.02

Table 1: Wholesale Price Index in India [2000-09]

Source: Handbook Of Statistics On Indian Economics: RBI, 2008-09 Sept 15 2009, Office of Economic Advisor Ministry of Commerce and Industry

The conversion process of Historical Cost Based (HCB) accounting financial statements for from 2004-05 to 2008-09 into Accounting for Current Purchasing Power (CPP) financial statements in terms of the index number prevailing in the month of March 2009 has elaborated below:

- All items of Profit & Loss Account, except Inventory Cost, Depreciation, Taxation, and Equity Dividend have been restated with reference to the "average price index of the year/period" as applicable to the individual year.
- Inventory cost has been restated after segregating opening balance of inventories, purchases of raw materials and closing balance of inventories as follows:
  - Opening balance of inventories restated in previous year average price index.
  - Closing inventories and purchases of raw materials restated in average year price index as applicable to the individual year.
- Fixed Assets and Depreciation cost of all the years of study has been adjusted to year base year 2000-01 at year end price index
- Taxation, Dividend on equity shares have been restated with reference to the "end of the year/period index" as applicable to the individual year
- The CPP Method divides the Balance Sheet items into two categories: Monetary items and Non-monetary items. Monetary items are those assets and liabilities the amounts of which are fixed by contract or statute in terms of the number of rupees irrespective of the changes in the purchasing power of rupee. Items which comes under monetary in nature are as follows:
  - Monetary assets include Investments, which are fixed in rupees, Current Assets other than Inventories.
  - Monetary Liabilities include Secured Loans, Unsecured Loans, Current Liabilities and Provisions

Since the value of monetary items is fixed in rupees, they are already expressed in terms of current purchasing power of rupee and, therefore, need no restatement. For Calculating purchasing power gain/loss, the balance of net monetary liabilities/assets as on the date of the Balance Sheet is bifurcated into opening balance and additions/decrements thereto during the year. The opening balance is restated with reference to the index prevalent on that date. Additions/decrements are restated with reference to the average index of the year. The closing balance is deducted from the total of restated opening balance and additions/decrements. The resultant figure, if positive, is gain otherwise loss in the case of net monetary liabilities and vice versa in the case of net monetary assets. After converting the Historical Cost Based (HCB) financial statements into Current Purchasing Power (CPP), the financial ratios have been calculated. The calculated ratios are presented in Table-2.

Liquidly Ratios	Profitability Ratio
Current Ratio	Gross Profit Margin
Quick Ratio	Operating Profit Margin
<b>Activity Turnover Ratio</b>	Net Profit Margin
Debtor Turnover Ratio	Return on Investment
Creditor Turnover Ratio	Dividend Payout Ratio
Inventory Turnover Ratio	

Table 2: Ratios Used In the Study

### 6. Comparative Analysis of Reported and Inflated Liquidity Ratios

These ratios are calculated to comment upon the short-term paying capacity of a firm or a concern's ability to meet its current obligation. The important liquidity ratios are current ratio and quick ratio. The Table -3 shows the Liquidity Ratios (current ratio and quick ratio) of sample companies from the year 2004-05 to 2008-09 under both the methods: HCB and CPP Method.

Year	Current Ratio		Quick Ratio	
	HCB Method	CPP Method	HCB Method	CPP Method
2004-05	1.26	1.32	1.03	1.03
2005-06	1.31	1.35	1.05	1.05
2006-07	1.36	1.39	1.13	1.13
2007-08	1.63	1.64	1.33	1.33
2008-09	1.31	1.31	1.10	1.10

Table 3: Liquidity Ratios

#### 6.1. Current Ratio

Current ratio is a measure of general liquidity and is used to make the analysis of a short-term financial position or liquidity of an organization. It represents the margin of safety. It is the relationship between the current assets and current liabilities. The relationship has been computed by dividing current assets with the current liabilities. A review on the above Table reveals that current ratio of sample companies has shown an increasing trend in the entire study period except the last year i.e., 2008-09. The absolute value of this ratio was 1.26 in 2004-05, which increased to 1.63 in 2007-08; but then declined to 1.31 in 2008-09 under HCB Method. Under the CPP Method, the ratio has also shown the similar trend, it gone up from 1.32 in 2004-05 to 1.64 in 2007-08 and then came down to 1.31 in the last year. Hence, the current ratios of sample companies are higher in case of CPP Method as compared to HCB Method in all the years except for the last year (2008-09), when the ratio stood one and the same, (1.31:1) under both the methods. However, the improvement of current ratio under CPP Method is very nominal, because inflation has affected non-monetary current assets and non-monetary current liabilities in the same proportion. Only the inventory holding has registered a higher growth than the inflation level. Hence it recorded an expansion under CPP Method.

#### 6.2. Quick Ratio

Quick ratio is also known as Acid Test Ratio or Liquid Ratio. It is a fairly stringent measure of liquidity. It is based on those current assets, which are highly liquid. It is the relationship between the quick assets and current liabilities. It has been calculated by dividing quick assets by the current liabilities. Inventories are excluded from the current assets to find out quick assets. Table-3 reveals that quick ratios of sample companies remains unchanged under both the methods, HCB and CPP; for all the year of study i.e.; from 2004-05 to 2008-09. It is because of the fact that, the inflation has affected non-monetary current assets and non-monetary current liabilities in the same proportion as the inventories have been excluded from current assets to get quick assets.

### 7. Comparative Analysis of Reported and Inflated Profitability Ratios

This group of ratios measures the overall performance and effectiveness of the firm. The main profitability ratios include Gross Profit Margin, Operating Profit Margin, Net Profit Margin, Return on Investment and Dividend Payout Ratio etc. The Table-4 shows the results profitability ratios under HCB method and CPP method from 2004-05 to 2008-09.

Year	Gross Profit Margin (%)		Operating Profit Margin (%)		Net Profit Margin (%)		Return on Investment (%)		Dividend Payout Ratio (%)	
	HCB	CPP	HCB	CPP	HCB	CPP	HCB	CPP	HCB	CPP
2004-05	29.18	28.74	18.47	17.23	11.24	8.28	52.89	44.26	36.60	60.78
2005-06	22.99	22.64	15.62	14.36	9.80	7.61	45.16	36.31	37.54	54.63
2006-07	23.51	22.97	15.42	13.90	10.35	8.69	46.18	35.43	32.68	55.47
2007-08	23.60	23.25	15.24	13.62	9.61	8.62	38.49	29.56	32.24	70.47
2008-09	22.87	22.23	13.67	11.53	8.29	6.45	48.58	31.23	31.15	47.13

Table 4: Profitability Ratios

#### 7.1. Gross Profit Margin

Gross profit margin measures the relationship of gross profit with sales and indicates the margin left after meeting manufacturing costs. It is clear from the Table-4 that the gross profit margin of sample companies for both the method i.e. HCB and CPP is fluctuating over the five years of study from 2004-05 to 2008-09. It recorded a high of 29.18 percent and 28.74 percent in 2004-05 and a low of 22.87 percent and 22.23 percent in 2008-09 under HCB Method and CPP Method respectively. During the entire period of study, the Gross profit margin under HCB Method has witnessed slightly higher trend as compared to CPP Method. Consequently the inflation has brought down the production efficiency of the sample companies.

#### 7.2. Operating Profit Margin

Operating Profit Margin shows the relationship between operating profit and sales. The above Table it evident that under HCB method, the operating profit margin of sample companies showed a declining trend in the period of study. The value of this ratio was 18.47 percent in 2004-05 and reduced to 13.67 percent in the last year of study. Similarly, under the CPP method the ratio has gone down from 17.23 percent to 11.53 percent over the same period. Furthermore, it is apparent from the Table that volume of Operating Profit Margin is higher in HCB Method in all the years under study as compared to CPP Method without any exception. It gives good reason to conclude that inflation has dwindled for the operating efficiency of the sample companies.

#### 7.3. Net Profit Margin

Net Profit Margin establishes a relationship between Net Profit (Profit after Tax) and Sales and indicates the overall efficiency of the management in manufacturing, selling, administrative and other activities of the organization. The Table-4 points out that net profit margin of sample companies has fallen down from 11.24 percent in 2004-05 to 8.29 percent in 2008-09 under HCB method, whereas in case of CPP method it dropped from 8.28 percent to 6.45 percent during same period. It can also be observed that in all the years of study there is a wide gap in net profit margin between the HCB method and CPP method. The variation between two net profit margins (HCB and CPP) was highest (2.96 percent) in the year 2004-05 and lowest (0.99 percent) in the year 2007-08. Thus the inflation has badly hit the overall profitability position of the sample companies during the period of study.

#### 7.4. Return on Investment

Return on Investment (ROI) is one of the most important ratios used for measuring the overall efficiency of the organization, as the objective of organization is to maximize its earnings. From the Table it is apparent that ROI has a declining trend in HCB method during the study period except the last year 2008-09. The value of this ratio varies between 52.89 percent (2004-05) and 38.49 percent (2007-08). Similarly, ROI under CPP method has a declining trend in all the years of study except the year 2008-09. The absolute figures of this ratio decreased from 44.26 percent to 31.23 percent over the span of five years i.e. from 2004-05 to 2008-09 after recorded a low of 29.56 percent in 2007-08. While comparing the two accounting methods, it is clear that ROI is much higher in case HCB, than CPP in all the years under study without any exception. The discrepancy between two methods (HCB and CPP) is highest (17.35 percent) in the year 2008-09 and lowest (8.63 percent) in the year 2004-05. Thus it can be concluded that ROI of the sample companies has been badly affected by inflation during period under our study.

#### 7.5. Dividend-Payout Ratio

It is the percentage of earnings paid to shareholders in dividends and provides an idea of how well earnings support the dividend payments. More mature companies tend to have a higher payout ratio. It is observed from the Table-4 that the dividend payout ratio in HCB Method has gone down from 36.60 percent to 31.15 percent during the study period i.e. 2004-05 to 2008-09. But in the case of CPP method the dividend payout ratio fluctuated in between 70.47 percent (highest) and 47.13 percent (lowest) during the period of study. Table-4 also reveals that HCB dividend payout ratio is lower than CPP dividend payout ratio throughout the period of study to a

large extent. It means the sample companies have kept less profit and distributed more to the shareholders as dividend. It definitely affects the net worth of the sample companies.

### 8. Comparative Analysis of Reported and Inflated Activity Ratios

Activity ratios are calculated to measure the efficiency with which the resources of a firm have been employed. These ratios are also called turnover ratios because they indicate the speed at which the assets are being turned over into sales.

Year	Creditor Turnover Ratio		Debtor Turnover Ratio		Inventory Turnover Ratio	
	HCB Method	CPP Method	HCB Method	CPP Method	HCB Method	CPP Method
2004-05	3.40	4.23	21.57	26.61	12.51	12.18
2005-06	3.77	4.50	21.79	25.75	11.44	11.22
2006-07	3.85	4.34	24.08	26.69	12.12	11.74
2007-08	3.76	4.06	23.97	25.39	11.89	11.65
2008-09	3.90	3.93	26.40	25.87	13.97	13.37

Table 5: Activity Ratios

The Table-5 elaborates the activity ratios; viz. Debtor Turnover Ratio, Creditor Turnover Ratio and Inventory Turnover Ratio of sample companies of both under HCB Method as well as CPP Method for the study period i.e. from 2004-05 to 2008-09. The trend of these ratios has discussed in the subsequent paragraphs.

#### 8.1. Creditors Turnover Ratio

In the course of business operations, an organisation has to make credits purchases and incur short-term liabilities. A supplier of goods i.e., creditors are naturally interested in finding out how much time the organisation is likely to take to repay its trade creditors. Higher creditor turnover ratio is good because it decreases the average payment period. It depicted from the Table that, HCB creditor turnover ratio of sample companies has increased from 3.40 times to 3.90 times during 2004-05 to 2008-09, whereas CPP creditor turnover ratio has turned down from 4.23 times to 3.93 times over the years after recording a high of 4.50 times in 2005-06. Over again while comparing this ratio under both the methods; it is revealed that CPP creditors' turnover ratios are higher than that of HCB for all the years except the year 2008-09. It indicates that the suppliers have been treated in a better manner under CPP method as compared to HCB method.

#### 8.2. Debtor Turnover Ratio

Debtor turnover ratio indicates the velocity of debt-collection of an organization. In simple words, it indicates the number of times debtors (receivables) are turned over during a year. Generally a high turnover ratio is an indicator of efficiency in management of debtors to sales. By looking into the Table, it can observed that in case of HCB method the debtor turnover of sample companies has improved over the study period where as in case of CPP method it was worse during the period. The debtor turnover ratio found 21.57, 21.79, 24.08, 23.97 and 26.40 times from 2004-05 to 2008-09 respectively in HCB method but, in the case of CPP method it is 26.61, 25.75, 26.69, 25.39 and 25.87 times correspondingly over the study period. Moreover by comparison, it is found that HCB debtor turnover ratios are smaller as compared to that of CPP for all the years of study i.e. 2004-05 to 2008-09. That means the inflation has improved the efficiency in debtors management of sample companies during the period of our study.

#### 8.3. Inventory Turnover Ratio

An Organization has to maintain a minimum level of inventory so as to be able to meet requirements of the business, but the level of inventory should neither too high nor too low. High inventory levels are unhealthy because they represent an investment with a rate of return of zero. It also opens the company up to trouble should prices begin to fall. By looking at the Table the inventory turnover ratio of sample companies in case of HCB method has varied over the study period from 2004-05 to 2008-09 after recording a high of 13.97 times in 2008-09 and low of 11.44 times in 2005-06. But in case of CPP inventory turnover ratio has come down from 12.18 times during 2004-05 to 11.22 times during 2005-06 and finally it reached to 13.37 times in 2008-09. In the assessment of HCB inventory turnover ratio and CPP inventory ratio, it is clearly observed that inventory turnover ratios are higher in the case of HCB method as compared to CPP method for all the years of study i.e. from 2004-05 to 2008-09. So it concluded that inventory turnover ratio of sample companies has suffered in the inflationary condition

### 9. Testing Of Hypothesis

For testing whether there a significance difference between reported and inflated financial ratios exist or not, t-test has been employed between the reported and inflated financial ratios.

Particulars	t- Statistics	p-Value
Current Ratio	-2.1502	0.0188
Gross Profit Margin	2.9901	0.0024
Operating Profit Margin	3.7177	0.0003
Net Profit Margin	5.1103	0.0000
Return on Investment	3.4662	0.0006
Creditor Turnover Ratio	-7.5652	0.0000
Debtor Turnover Ratio	-6.0256	0.0000
Inventory Turnover Ratio	5.5831	0.0000

Table 6

The table-6 indicates t-Statistics and p-Value of the t-test between the reported and inflated financial ratios. It can find out from the table that all the ratios' p-value found to be less than 0.05, which indicates a significant difference in the value of financial ratios between the two accounting methods at 5 percent level of significance. Hence our Null Hypothesis ( $H_{01}$ - There is no significant difference in between reported and inflated financial ratios) is rejected as there is a significance difference in reported and inflated financial ratios. Therefore the Alternative Hypothesis ( $H_{a1}$ ) is accepted.

## 10. Conclusion

From the above analysis and comparisons of reported and inflated financial ratios, certainly it has detected that inflation has affected all the ratios under study except the quick ratio. Under inflationary condition the current ratio, creditor turnover ratio and debtor turnover ratio have changed between two accounting method and performed better, but no change has transpired to the quick ratio. On the other hand all the profitability ratios and inventory turnover ratio have suffered due to inflation. Moreover, the dismal performance revealed under the CPP method points towards the efficiency of the management in fighting against inflation. Whatever view one takes, no one can deny that, but inflation has taken its toll. The performance which otherwise appears to be quite good, turned out to be very dismal, when adjustments for current purchasing power of rupee are made. The CPP method adjustments have thus proved that historical profitability is a fairy story. The financial ratio analysis thus confirms the findings that historical accounts overstate financial performance and understate financial position.

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## Mining of Temporal Optimal High Utility Item Sets from Data Streams

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### **Abstract:**

*Temporal High Utility Item (THUI) mining has become an emerging research topic in the data mining field, and finding frequent item sets is an important task in data mining with wide applications. Two basic factors to be considered in utility mining. First, the utility (e.g., profitability, time) of each item may be different in real applications; second, the frequent itemsets might not produce the highest utility. In this paper, we propose a novel algorithm named TOUIG (Temporal Optimal Utility Item Set Generation) which can find optimal high utility item sets from database. A novel approach namely, TOUI-tree (Temporal Optimal Utility Item set tree), is also proposed for efficiently capturing the utility of each item set with one-time scanning. The main contributions of this paper are as follows: 1) OUIG is the first one-pass utility-based algorithm for mining temporal optimal utility item sets and the experimental results show that our approach produces optimized solution than other existing utility mining algorithms.*

**Key words:** Data mining, utility mining, temporal high utility item sets

### **1. Introduction**

Temporal data mining is a single step in the process of Knowledge Discovery in Temporal Databases that enumerates structures (temporal patterns or models) over the temporal data. Examples of temporal data mining tasks are classification and clustering of time series, discovery of temporal patterns or trends in the data, associations of events over time, similarity based time series retrieval, time series indexing and segmentation. Temporal data mining aims to discover hidden relations between sequences and subsequences of events. The discovery of relations between sequences of events involves mainly three steps:

- Representation and modeling
- Sequencing the data in a suitable form
- Similarity measures between sequences application of models and representations to the actual mining problems.

#### *1.1. Problem Statement*

Given a data stream, a pre-defined utility table and a user-specified minimum utility threshold, the problem of mining temporal maximal high utility itemsets using the landmark model is to find the set of TMUIs from the landmark timestamp over the transactional database.

#### *1.2. Time Series*

A Time Series is an ordered sequence of data points. Typically it's measured at successive times spaced at uniform time intervals. A huge amount of data is collected everyday in the form of event time sequences. Common examples are recording of different values of stock shares during a day, each access to a computer by an external network, bank transactions, or events related to malfunctions in an industrial plant. These sequences represent valuable sources of information not only to search for a particular value or event at a specific time, but also to analyze the frequency of certain events, discover their regularity, or discover set of events related by particular temporal relationships. These types of analyses can be very useful for deriving implicit information from the raw data, and for predicting the future behavior of the process that we are monitoring.

## 2. The Apriori Algorithm

The key idea of the algorithm is to begin by generating frequent item sets with just one item (1-item sets) and to recursively generate frequent item sets with 2 items, then with 3 items, and so on until we have generated frequent item sets of all sizes. It is easy to generate frequent 1-item sets. All we need to do is to count, for each item, how many transactions in the database include the item. These transaction counts are the supports for the 1-item sets. We drop 1-item sets that have support below the desired minimum support to create a list of the frequent 1-item sets. To generate frequent 2-item sets, we use the frequent 1-item sets. The reasoning is that if a certain 1-item set did not exceed the minimum support, then any larger size item set that includes it will not exceed the minimum support. In general, generating  $k$ -item sets uses the frequent  $k-1$  item sets that were generated in the previous step. Each step requires a single run through the database, and therefore the Apriori algorithm is very fast even for a large number of unique items in a database.

## 3. A Study On Purchases Of Cell Phone Face-Plates

A store that sells accessories for cellular phones runs a promotion on faceplates. Customers who purchase multiple faceplates from a choice of six different colors get a discount. The store managers, who would like to know what colors of faceplates customers are likely to purchase together, collected the following transaction database.

Transaction	Faceplate	Colors	Purchased	
1	red	White	green	
2	white	Orange		
3	white	Blue		
4	red	White	orange	
5	red	Blue		
6	white	Blue		
7	white	Orange		
8	red	White	blue	green
9	red	white	blue	
10	yellow			

Table 1: Transactions for Purchases of Different Colored Cellular Phone Faceplates

### 3.1. Generating Candidate Rules

Trans	red	white	blue	orange	green	yellow
1	1	1	0	0	1	0
2	0	1	0	1	0	0
3	0	1	1	0	0	0
4	1	1	0	1	0	0
5	1	0	1	0	0	0
6	0	1	1	0	0	0
7	1	0	1	0	0	0
8	1	1	1	0	1	0
9	1	1	1	0	0	0
10	0	0	0	0	0	1

Table 2

Now, suppose that we want association rules between items for this database that have a support count of at least 2 (equivalent to a percentage support of  $2/10=20\%$ ). In other words, rules based on items that were purchased together in at least 20% of the transactions. By enumeration we can see that only the following item sets have a count of at least 2: Item set support (count)

- {red}-> 6
- {white}-> 7
- {blue}-> 6
- {orange}-> 2
- {green}-> 2
- {red, white}-> 4
- {red, blue}-> 4
- {red, green}-> 2
- {white, blue}-> 4
- {white, orange}-> 2
- {white, green}-> 2

- {red, white, blue}-> 2
- {red, white, green}-> 2

The first item set {red} has a support of 6, because 6 of the transactions included a red faceplate. Similarly the last item set {red, white, green} has a support of 2, because only 2 transactions included red, white, and green faceplates.

The computation of confidence in the second stage is simple. Since any subset (e.g., {red} in the phone faceplate example) must occur at least as frequently as the set it belongs to (e.g. {red, White}), each subset will also be in the list. It is then straightforward to compute the confidence as the ratio of the support for the item set to the support for each subset of the item set. For example, from the item set {red,white,green} in the phone faceplate purchases we get the following

### 3.2. Association Rules

#### Rule 1:

{red, white} => {green} with  
*confidence* = support of {red, white, green}/  
 support of {red, white}  
 = 2/4 = 50%;

#### Rule 2:

{red, green} => {white} with  
*confidence* = support of {red, white, green}/  
 support of {red, green}  
 = 2/2 = 100%;

#### Rule 3:

{white,green} => {red} with  
*confidence* = support of {red, white, green}/  
 support of {white,green}  
 = 2/2 = 50%;

#### Rule 4:

{red} => {white,green} with  
*confidence* = support of {red, white, green}/  
 support of {red}  
 = 2/6 = 33%;

#### Rule 5:

{white} => {red,green} with  
*confidence* = support of {red, white, green}/  
 support of {white}  
 = 2/7 = 29%;

#### Rule 6:

{green} => {red,white} with  
*confidence* = support of {red, white, green}/  
 support of {green}  
 = 2/2 = 50%;

### 3.3. Pseudocode

#### **Algorithm 1. aPriori algorithm[14]**

Input:

I //Itemsets

D //Transactions

S //support threshold

Output:

L // large itemsets

```

aPriori algorithm
k = 0 // k is used as the scan number
L =  $\emptyset$ 
C1 = I //Initial candidates are set to be the items
repeat
k = k + 1
Lk =  $\emptyset$ 
for each Ii  $\in$  Ck do
ci = 0 //Initial counts for each itemset are 0
for each tj  $\in$  D do
for each Ii  $\in$  Ck do
if Ii  $\in$  tj then
ci = ci + 1
for each Ii  $\in$  Ck do
if ci  $\geq$  s do
Lk = Lk U Ii
L = L U Lk
Ck+1 = aPriori-Gen (Lk)

```

#### Algorithm 2. aPriori-Gen algorithm

```

Input:
Li-1 //Large itemsets of size i-1
Output:
Ci //Candidates of size i
Apriori-Gen algorithm
Ci =  $\emptyset$ 
for each I  $\in$  Li-1
for each J  $\neq$  I  $\in$  Li-1 do
if i-2 of the elements in
I and J are equal
then
Ck = Ck U {I U J}.

```

#### 4. Proposed Work

A formal definition of utility mining and theoretical model was proposed where the utility is defined as the combination of utility information in each transaction and additional resources. Another algorithm named Two-Phase was proposed in which achieves for finding high utility itemsets. It presented a Two-Phase algorithm to prune down the number of candidates and can obtain the complete set of high utility itemsets. In the first phase, a model that applies the “transaction-weighted downward closure property” on the search space to expedite the identification of candidates. In the second phase, one extra database scan is performed to identify the high utility itemsets. However, this algorithm must rescan the whole database when added new transactions from data streams. It need more times on processing I/O and CPU cost for finding high utility itemsets. Hence, Two-Phase algorithm is just only focused on traditional databases and is not suited for data streams. Although there existed numerous studies on high utility itemsets mining and data stream analysis as described above, there is no algorithm proposed for finding temporal high utility itemsets in data streams. This motivates our exploration on the issue of efficiently mining high utility itemsets in temporal databases like data streams in this research. The goal of utility mining is to discover all the itemsets whose utility values are beyond a user specified threshold in a transaction database. Utility mining is to find all the high utility item sets. Two-Phase algorithm for pruning candidate itemsets and simplify the calculation of utility. Is the sum of the transaction utilities of all the transactions containing X. So Phase I overestimates some low utility itemsets, it never underestimate itemset, Second, one extra database scan is performed to filter the overestimated itemsets in phase II, a progressive transaction-weighted utilization set of itemsets

Algorithm –TOUIG (Temporal Optimal  
Utility Itemsets Generation)

Input:

Step1: Sample Database from any

Step2: constraints minus, minconfidence, minutility

```
Output: all utility-frequent Itemsets
step 3. Find all quasi-utility frequent itemsets
    i) Candidateset=QUF-Apriori(DB,minutility,minsup)
Step4. Pruning Utility-Infrequent itemsets
    for each C
    for each C in candidateset
    for each T in DB
    if C in T a and U(C,T)>=minUtil
        c.count +=1
return {c in candidateset |c.count>=minsup}
end if
Step 5. End
```

## 5. Conclusion

Predicting high utility itemsets is the future is one aspect in designing profitable day trading strategies. Technical analysis analyzes, price, volume and other market information, whereas fundamental analysis looks at the facts of the company, market, currency or commodity. Most large brokerage, trading group, or financial institutions will typically have both a technical analysis and fundamental analysis team.

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## Technological Innovation through Knowledge Sharing: Socio-Organizational Perspectives

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### **Abstract:**

*The purpose of this research is to propose a study of impact on knowledge sharing framework to manage software projects where employees working in different work locations. To support the arguments made based on review literature, the researcher presents the holistic framework of knowledge sharing in a software development company and also provides a model to solve the problem of knowledge sharing objections. The researcher would then apply the framework to study the existence of knowledge sharing process in a software development company to examine the effectiveness of knowledge sharing. The research would then focus on elucidating how advances in computing and information technology can be used to implement information technology systems for the benefit of individuals, organizations and society. It would also focus on how socio-technical and organizational perspectives are integrated in order to create useful system solutions leading to social change and meaningful development and job creation.*

**Key words:** Project Management, Knowledge management. Human resource management

### **1. Introduction**

Companies across many industries have achieved the kind of revenue growth that stockholders are demanding by off shoring software development. While driving down hourly and projected costs in a significant fashion, off shoring has distributed development teams across the globe.

Distributed development has grown in clear phases. In the first phase, teams were made up of employees of a single company in multiple locations within that company. Those employees could be distributed across two or three buildings on a campus or across several states, provinces, or regions. Distribution became global in the next phase as companies, either through wholly owned subsidiaries or joint partnerships, purchased facilities in other countries and directly employed citizens of those countries. The latest phase has seen more partnerships between vendors who have their own distributed development capabilities.

Due to a changing business environment today, organisations are facing challenges of global competitiveness. Furthermore, organisations are confronted more and more with issues such as fast technological changes, product lifecycle shortened, downsizing, and high market volatility. In order to cope with these challenges, organizations need to be able to manage highly distributed diversified knowledge. Challenges rely on the identification of crucial knowledge that improves the business process. Knowledge is central but even more so is the understanding of the knowing process, and the learning and knowledge transfer/sharing process. Companies understanding the need to harness knowledge are aware about the crucial issue of creating a work environment that fosters knowledge sharing mechanisms and learning capabilities within and across organisations. It is well recognized that knowledge-sharing mechanisms are highly complex processes to promote in the organization. Indeed knowledge-sharing hostility is perceived rather as a phenomenon that widely dominates organizational reality.

#### *1.1. Managing Global Software Projects*

Software development world over has drastically changed and the rules of the game are being continually rewritten. The typical

changes that can be observed and experienced in the area of managing software projects are vanishing geographical boundaries, shrinking product life cycles; increasing competition, changing business models, commoditization of technology. In order to succeed and cater to this ever-changing scenario, products need to reach the markets faster, with higher quality and harness the global resources. Managing global software projects is about the three dimensions of software project management – people, process and technology – and the interactions between them, particularly when the team is geographically distributed. Project management issues that confront global and distributed teams; a fair balance across the three dimensions – people, process and technology – contributing to the success of geographically distributed teams.

The problems of globally-distributed development teams are lack of Information, Information overload, reinventing the wheel, loss of crucial knowledge due to a key employee leaving the organization and poor sharing of knowledge in the organization.

## 2. Impact Analysis of Knowledge Sharing Process in Global Software Projects

In order for knowledge management to be effective, it requires a fundamental change in the way companies run their business. This is particularly significant as the heart of any effective change is the people themselves (Davis, 1998). The knowledge of the people is created and expanded through social interaction between people and their creative activities (Nonaka & Takeuchi, 1995). Changing people's behavior seems to be most difficult especially promoting knowledge sharing among employees. These are appreciation of the importance of knowledge, communication skills, motivation, absorptive capacity, reputation, incompatible personality, disciplinary ethnocentrism and technophobia). In addition, Engstrom (2006) suggests other factors such as career satisfaction, job satisfaction and career prospect also affect knowledge sharing behavior while Ryu et al. (2006) believe individual factors such as attitude, subjective norms and perceived behavior also have significant role. Apparently, there are many other factors that affect knowledge sharing. This is evident when Awad & Ghaziri (2004) suggest factors like personality and attitude; Lin (2007) suggests enjoyment in helping others and self efficacy; and Van den Brink (2003)<sup>10</sup> identifies motivations, trust and care that enable knowledge sharing. From the literatures, it is evident there are many individual related factors that influence knowledge sharing practice. This is because many researchers combined many related socio psychological theories to develop a theoretical model to study knowledge sharing in organizations (Samieh & Wahba, 2007). However, since the study on knowledge sharing in public sector is still at scarce (McAdam & Reid, 2000; Syed Ikhsan & Rowland, 2004), to the knowledge of the authors, there is as yet no well-established knowledge sharing model.

Previous studies reveal that people are reluctant to share knowledge though their organizational culture promotes the practice (Lu et al., 2003). According to Riege (2005), there are seventeen potential individual factors that hinder people from sharing knowledge.

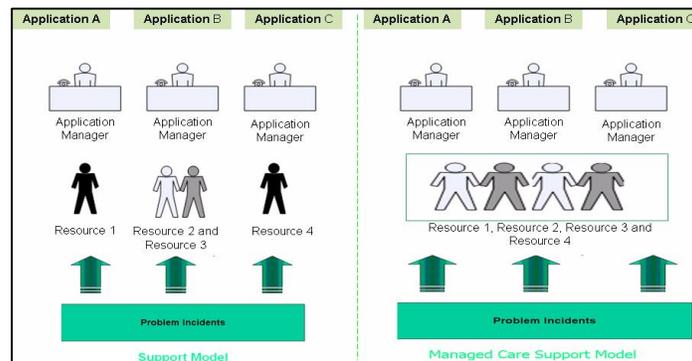


Figure 1: Knowledge Sharing Across Teams

In IT industry general process on each application is supported by one or many resources depending on the complexity of the application. Every resource supports an application as primary or secondary and also gathers knowledge of another application as cross trained backup. This makes sure that the knowledge is shared across applications and helps in case of attrition or prolonged absence of the supporting resources.

The present research aimed at ascertaining the process of knowledge sharing in a global project development and its total effectiveness for the increase in the individual efficiency, organizational efficiency and productivity. The gaps in the literature clearly identified the various elements of knowledge sharing like sharing with internal team members, sharing with project developments with co-located team members and sharing with non team members besides these elements the literature also identified knowledge sharing on general views, specific requirements, process techniques, progress reports, total results and proper communication to onsite or offshore project team members. In this process of knowledge sharing is expected to have its relationship with job security, team reorganization, increasing competence advantage and improving customer focus.

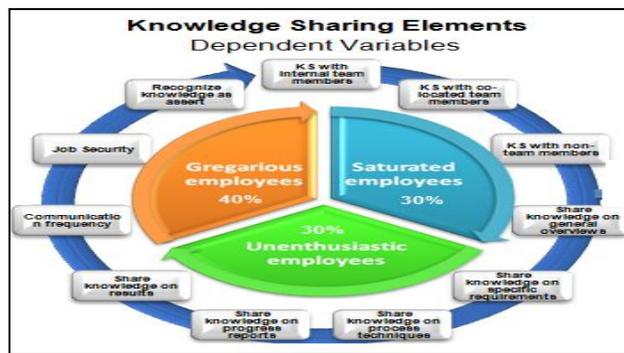


Figure 2: Knowledge Sharing Elements – Dependent Variables

My Research is focused toward analyzing impact of knowledge sharing in IT industry as first stage. The key elements are focus by project management to ensure the project success by knowledge sharing process in IT industry.

Second stage, it is necessary to identify the knowledge sharing elements like knowledge sharing with internal team members, knowledge sharing with co-located team members, knowledge sharing with non-team members, share knowledge on general overviews, share knowledge on specific requirements, share knowledge on process techniques, share knowledge on progress reports, share knowledge on results, communication frequency, job security and recognize knowledge as asset.

Third stage, it is necessary to identify effectiveness of knowledge sharing like, Improving competitive advantage, Improving customer focus, Innovations, Inventory reduction, Employee development, Cost reduction, Revenue growth, Better decision-making, Intellectual property rights, Faster response to key issues, Improving quality and Improving delivery.

Knowledge management requires technology, business strategy and people that transfer knowledge into means of a readily accessible vehicle. We understand that knowledge management is one of the key areas for sustained support, enhanced business and to be on top of the client’s competitors. We have practiced the knowledge management processes given in this paper successfully for the past six years and have constantly improved the process based on lessons learnt/feedback from the client and issues faced in previous knowledge management experiences.

The work location place a major role in determining the potentiality of the employees as well as their interest towards organizational development. The employees involvements depends upon their work location as well as a co-relate effects of organizational commitments.

The age is another important factor in determining the potentiality of the employees as well as their interest towards organizational development. The employees involvements depends upon their age group which co-relate effects of organizational commitments. The gender place a major role in determining the potentiality of the employees as well as their interest towards organizational development. The employees involvements depends upon their work location as well as a co-relate effects of organizational commitments

The designation is another important role in determining the capability of the employees as well as their commitments towards organizational development. The employees involvements depends upon their which effects of organizational commitments Finally, The work experience place a major role in determining the knowledge sharing process and effectiveness of knowledge sharing. The employee’s involvements depend upon their work experience.

It is often said that it is essential to create a "knowledge sharing culture" as part of a knowledge management initiative. An isolated knowledge management program looked after by a privileged few is a paradox in itself and will not survive for long. Only effective collaboration and communication which spans across the whole company structure will give knowledge management the boost it really needs. In order to enrich a company’s current culture the change must start at the individual. Every employee has a sphere of influence along with their own individual knowledge, and this is where he believes a knowledge sharing culture can begin.

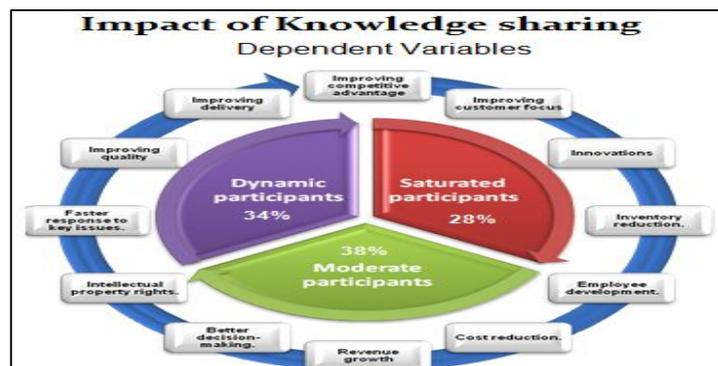


Figure 3: Impact of Knowledge Sharing – Dependent Variables

Knowledge is often seen as a rich form of information. This differentiation however is not terribly helpful. A more useful definition of knowledge is that it is about know-how and know-why. A metaphor is that of a cake. An analysis of its molecular constituents is data – for most purposes not very useful – you may not even be able to tell it were a cake. A list of ingredients is information – more useful – an experienced cook could probably make the cake – the data has been given context. The recipe though would be knowledge – written knowledge - explicit knowledge – it tells you how-to make the cake. An inexperienced cook however, even with the recipe might not make a good cake. A person, though, with relevant knowledge, experience, and skill – knowledge in their heads - not easily written down - tacit knowledge – would almost certainly make an excellent cake from the recipe. It is important to note that to make knowledge productive you need information. Knowing how to make a cake is not sufficient – you need the list of ingredients. And to decide what cake to make - you need information – the tastes of the consumers of the cake. Know-why is also important. If an ingredient of the cake was unavailable – knowing the purpose of that ingredient might help a knowledgeable cook substitute an alternative. In fact know-why is often more important than know-how as it allows you to be creative - to fall back on principles – to re-invent your know-how.

There are many definitions of Knowledge Management. A common definition is ‘the collection of processes that govern the creation, dissemination, and leveraging of knowledge to fulfill organizational objectives.’ I feel this definition is inadequate, however, as it limits knowledge management to a set of processes. I prefer what I feel is a more useful definition:- “Knowledge Management is a business philosophy. It is an emerging set of principles; processes, organizational structures, and technology applications that help people share and leverage their knowledge to meet their business objectives.” This puts focus and responsibility on the individual – the knowledge worker - and on the holistic nature of knowledge management. Also critically it is about meeting business objectives. Knowledge Management is not an end in its self. It is also fundamentally about sharing knowledge and putting that knowledge to use.

### **3. Technology, Innovation and Social Change**

The aim of the research forum would be to develop a model for academicians and practitioners from multiple disciplines to debate and deliberate on social change that is encompassed by innovation and information technology.

Technological expertise plays a significant role in the global economy (Archibugi & Lundvall, 2001). Many agree that combination of technology and innovation could attribute to inclusive growth. Though several technological inventions are produced, the intention of inclusive growth across the globe remains unachieved. There are greater challenges where science, technology and innovation become the key to improve economic performance and social well-being. However, the concept of social well-being is constantly linked to social change. Unless existing social settings, that restrict the participation of some social groups in societal life are not transformed, achieving social wellbeing is going to remain a difficult task. On the other hand, entrepreneurship as a movement produced technologies which are used for achieving significant growth. However, the growth that the business enterprises have brought could not transform the social settings which everyone is part of. As a result, there is always a kind of conflict between business and society whether they both are mutually beneficial or not.

It is observed that globalization has tremendously affected the functioning of poor and deprived, and it is more disastrous in case of developing countries. Globalisation has been always considered as a process of exchanging resources among the nations. Though Globalisation is expected to benefit both developed and developing countries, in reality, it is the developed countries gained a lot through utilizing the cheap resources available in the developing countries. For instance, various multinational corporations have outsourced their business processes at developing countries due to the available cheap resources. We also have to accept that the developing countries have also benefited up to some extent while they imported the technological expertise available in the West. However, globalization has failed to take into account the usefulness of certain local innovative technologies in developing countries. This could be due to because of two reasons - a) local technologies may not be cost effective; b) available cheap technologies from the developed countries. Even though, the local technologies are not cost effective, it might be suitable for the wellbeing of these societies. Moreover, the gap between knowledge availability in the developing countries and the exploitation of the same for the improvement of the wellbeing might be an issue related to technology development process. In addition, there is a section which argues that attaining social wellbeing can be easily achieved provided that steady economic growth is maintained. Also, the reality describes that the growth in economic sense never help the different excluded social groups to attain what they have not been accessed so far. We may not get any better instances than the present Indian context to describe the reality, as more economic growth we attempt the more social disparities we witness.

At this juncture, social entrepreneurship is considered as a new model of developmental discourse that balances both economic and social growth. Social entrepreneurs strive to change social settings so that everyone is given space to enjoy his/her rights to lead a pleasant life. They are considered as pioneers and path breakers in their respective fields. They question the status quo and exploit the resources and opportunities to build societies that guarantee rights to the most excluded. There are two stages involved in the overall usages of technologies - one is production of technologies by the entrepreneurs and the second, usages of the same technologies for the social development by the social sector organisations. Significantly, emergence of social entrepreneurs has resulted in social leaders entering into both manufacturing and using the technologies to promote social development.

Social entrepreneurs have adopted innovative processes to bring social change. In this process, the state also acts as a dominant actor. However, neither the State nor civil society initiations alone can promote social change. There is a greater scope for both these institutions to partner and promote social ventures and social change. Eco system that includes public and private sector institutions such as Government, incubation centers, corporate social responsibility initiatives must demonstrate commitment and active participation to bring about social change.

The research would conclude, in order to reach out to the most excluded, service delivery has to be innovative. It needs to focus on three major areas - a) new technologies, that are capable of producing new products in a cost-effective manner; b) social innovation that ensures distribution of goods and services; c) be adaptive in order to integrate the goods and services to the local settings (Widdus & White, 2004). Hence, technology and innovation should play complimentary roles in the process of social change. Given the significance of this domain, there is a need for discussion and debate on aspects related to the discourse of social change.

#### 4. Conclusion

This descriptive and empirical research revealed the knowledge sharing culture is indispensable among the employees to increase their participants for the organizational development both offshore and onshore employees are duty bound to share their opinion on technical knowledge as well as to distribute their notions towards technical sharing of knowledge. It is concluded that sharing mechanism is conducive in IT industry and create suitable work environment for their employees. The gender wise classifications and other demographic segmentation are crucial in determining the employee's fullest participation in developing their knowledge as well as to motivate them. The culmination of knowledge sharing is ascertained through effective organizational climate and constructive cultural changes. The gorgeous of the employees is highly indispensable for in creational point of knowledge sharing process. The interpersonal relationship and executive developments are the pillars to successfully implement knowledge sharing process in any organizational. The creation of knowledge sharing culture and suitable reward system for the knowledge sharing of the employees are highly suitable for the organization to obtained best of potentialities of the employees. The holistic approach of competency mapping and the performance appraisal system determine the knowledge distribution among (top level, middle and operational level employees). The continuous training process and motivating the employing to overcome the problems help employees to share their views and experience of knowledge with fellow employees.

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## Unorganized Manufacturing Industries in Uttar Pradesh: An Empirical Study

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### **Abstract:**

*The main purpose of this study is to find out that how many OAMEs, NDMEs; DMEs are there in unorganized manufacturing industries. It also aims to find the use of machines in these units and the labor-capital ratio. Attempt is made to show the number of female and male workers in these units. Sample size is hundred unorganized manufacturing units. Target area is Ghaziabad and Noida which is the industrial hub of Uttar Pradesh. It is an empirical study. This study is different from majority of work, researches done in unorganized manufacturing industries because it is based on primary data. Majority of the studies are done on secondary data collected from NSSO. But in this study there have been direct interaction with the respondents.*

**Key words:** unorganized manufacturing, OAME, NDME, DME, labor

### **1. Introduction**

There are many controversies on the concept of unorganized sector. It is sometimes described as the sector which is not recorded under any factory legislation. The term 'informal sector' was first coined by Hart. He describes the informal sector as that part of the urban labor force which falls outside the organized labor market. National Sample and Survey (NSS) framework has defined that the unorganized manufacturing sector includes all manufacturing enterprises except: those registered under section 2m-(i) and 2m(ii) of factories Act, 1948. And bidi and cigar workers (conditions of employment) Act, 1966; those run by government/ Public Sector Enterprises. Unorganized sector is divided into three types of enterprises, these are: Own Account Manufacturing Enterprise (OAME), Non-Directory Manufacturing Establishment (NDME), Directory Manufacturing Establishment (DME). Own Account Manufacturing Enterprise (OAME) is one, which runs without any hired worker employed on a fairly regular basis and is engaged in manufacturing and/or repairing activities (with family labor only). An establishment employing less than six workers (household and hired workers taken together) and engaged in manufacturing activities is termed as Non-Directory Manufacturing Establishment (NDME). A Directory Manufacturing Establishment (DME) is one which has employed six or more workers (household and hired workers taken together) and is engaged in manufacturing activities. Unorganized sector is of great relevance because it has a huge potential for job creation. The aggregate manufacturing Gross State Domestic Product (GSDP) of all states and UTs is distributed between (unregistered) sectors. There has been a high correlation in the existence of organized and unorganized industry. It has been found in studies conducted by National Sample Survey Organization (NSSO) that states with high share of organized manufacturing in the country also have high share in the unorganized manufacturing. This shows that unorganized industry generally coexists with the organized industry. Uttar Pradesh comes under top five states which has high share in manufacturing Gross State Domestic Product (GSDP). Andhra Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal are the five states among all the states in India that accounts for 55% of the nation-wide employment in unorganized manufacturing (T.S Papola et al). In a comparative study of twenty-five states it has been found that in seven states all the three enterprises that is OAME, NDME and DME has shown a fall in 2005-06 compared to 1995-95 in the four variables that are: number of enterprises, employment, Gross value added and fixed assets. The plan of this paper is as follows. The literature is reviewed in Section 2. In Section 3, theoretical Framework is given. Section 4, discusses the data set used. Methodology is explained in Section 5. In Section 6, Findings are shown. Section 7 concludes.

## 2. Literature Review

Kalirajan et al (2004) has explained that the two reasons for the rapid growth of unorganized manufacturing sectors are: urbanization and rural to urban migration. It was observed that in the post 1997-98 period, output in the organized sector has grown at a slower rate than in organized manufacturing. The reasons are the emergence of flexible production systems and substantial increase in outsourcing by the organized sector. There is a need to study the size, structure and performance of unorganized manufacturing sector in India.

Neeru Garg (2012) has found that women are mainly occupied in unpaid and part-time jobs and their share in hired workers and full time jobs is very low. Poverty can be tackled by providing opportunities of productive employment to women. In unorganized manufacturing sector of India 'feminization of part-time jobs can be associated with urbanization of female workers. Also, among three types of enterprises, DMEs follow the least discriminating practices among men and women workers. It was suggested that 'true and just' development can be achieved only when half of the world's population is recognized as equivalent to the other half.

Breman (1999) has given attributes that why less study has been done on this unorganized manufacturing sector. The reasons are: lack of knowledge regarding the lower level of the urban economy, lack of affinity with methods of research that could increase that knowledge.

Kundu (1998) has focused on the need for research in unorganized sector. Very small number of studies have been done on the unorganized manufacturing sector. This bias is even clearly visible in the Indian Statistical system.

Kulashreshta et al (2001) has found that India's manufacturing sector has a large unorganized component (comprised of units less than 10 employees using power and those units with 10 to 19 employees not using electric power) employing about 3/4<sup>th</sup> of the manufacturing workforce and contributing to 17% of the total National Domestic Product (NDP) of the unorganized non-agricultural sector.

Thomas (2002) has explored that the unorganized manufacturing sector has a growth rate of 9.3% in the 1990's which shows that it is a fast growing segment of India's domestic economy.

Unni et al (2001) found that there have been a decline in Total factor Productivity (TFP) in both the organized as well as unorganized sector for the period under study. Also, positive labor and capital productivity in the unorganized sector during late 80's is observed.

## 3. Objectives

Mostly, all the studies and research work done on unorganized manufacturing industries in India is based on secondary data collected from National Sample Survey Organization (NSSO) survey of employment and unorganized enterprises. But, this study is based on primary data. The objectives of this study are:

- To classify the unorganized manufacturing industries on the basis of OAME, NDME and DME.
- To find out the number of female workers contributing in unorganized manufacturing units.
- To find the usage of machines in these industries.

## 4. Data Set and Methodology

Primary data is collected with the help of Questionnaire. Sample size is 100 unorganized manufacturing units. Five major manufacturing industries are considered. Target respondents are the owner of organized manufacturing units in Uttar Pradesh. Target area is Uttar Pradesh because according to researches, it has the highest level of labor productivity in the unorganized sector. Also, Uttar Pradesh is among top five states that together accounts for 55% of the nation-wide employment in unorganized manufacturing sector. Sample is collected from the districts of Ghaziabad and Noida as they are the leading industrial hubs in Uttar Pradesh. It is an empirical study based on the data collected from the survey.

S.No.	Industry	NIC Code 1998	Total No. Of Units	OAME	NDME	DME
1.	Metal & metallic product	27	21	13	6	2
2.	Textile	17	18	6	8	4
3.	Wood	20	12	6	2	4
4.	Food products & beverages	15	20	14	2	4
5.	Non-metallic mineral products	26	29	23	4	2

Table 1: Classification of Industry On The Basis Of OAME, NDME and DME

Industry	No. Of Units	Total No. Of Workers	No. Of Power/Electric Machines	L/K
Metal & metallic product	21	78	2	39
Textile	18	88	2	44
Wood	12	64	0	0
Food products & beverages	20	96	4	24
Non-metallic mineral products	29	38	3	12.67

Table 2: Labor- Capital Ratio in the Sample Units

Industry	No. Of Units	No. Of Male Workers	No. Of Female Workers
Metal & metallic product	21	47	31
Textile	18	40	48
Wood	12	40	24
Food products & beverages	20	82	14
Non-metallic mineral products	29	38	0

Table 3: Number of Male and Female Workers in the Sample Unit

## 5. Findings

Table 1 shows total number of units covered under each industry. Also, these units are further classified in terms of OAME, NDME and DME. In OAME, no worker is hired from outside, only family members constitutes the labor force. Number of OAMEs is more in all the five industries as compared to NDME and DME. DMEs contribute very less in total number of units. NDME and DME both hire workers and helps in job creation. But as it can be seen that majority share is of OAME so job opportunities are less in them.

Table 2 shows the total number of workers and number of machines used in each of the industry. It can be seen that all the unorganized manufacturing units are labor intensive. The proportion of capital is almost negligible. The ratio L/K represents the labor-capital ratio, which indicates that use of machine in unorganized units is very less. In case of wood industry, there is no use of machine in 12 units. In textile industry, there is usage of hand machines like sewing machine etc. But the electric machines used just counts 2 in 18 units. Number of units in non-metallic products are highest that is 29, but still only 3 machines are used in total.

Table 3 shows number of male and female workers in the sample units. Male workers are more than female in all the industries except in Textile industry. Reason being that the stitching, sewing are mostly done by females. In non-metallic mineral products industry, most of the units are OAME in which manufacturing is generally carried by two to three male persons. Number of female workers are zero. The reason for the less number of female workers given by the owners of many units is that they are considered as distraction for other male workers and also, due to security issues of females.

## 6. Conclusion

The study shows that in the sample of hundred unorganized manufacturing units, majority of them are OAME. NDME and DME constitute less proportion. All the three types of enterprises are labor intensive. The use of machines is almost negligible. Thus, it can be said that unorganized manufacturing industries has huge potential of job creation. But it can also be not ignored that major part is of OAME which do not hire workers, rather works with family labor. Number of female workers in these sample units is relatively less than male workers. It is expected that unorganized units must be having more of female workers but the actual figure is reverse of it according to this study.

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## Comparative Analysis of Noise Reduction Techniques For Image Enhancement

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### **Abstract:**

*A great deal of effort has been devoted in recent years for developing algorithms to reduce the noise that is inherent in all digital images. This paper presents a critical analysis of image noise reduction algorithms in general. Noise removal is an important task in image processing. The results of the noise removal have a strong influence on the quality of image processing techniques. The nature of the noise removal problems depends on the type of noise corrupting the images. Several techniques for noise removal are well established in the domain of image processing. This Paper presents a comparative analysis on some of the efficient image de-noising algorithms and analyses different objective image quality measurement parameters.*

**Key words:** Image Noise, Linear filter, Non-Linear filter, Adaptive Filter, Median Filter, Image Quality Evaluation Metrics, Image Quality Index

### **1. Introduction**

One of the most important stages in image processing applications is noise filtering. Image noise is a random, usually unwanted, variation in brightness or colour information in an image. The main sources of noise in digital images are imperfect instruments, problem with data acquisition process, interference of natural phenomena, transmission and compression [5] [19]. The amplification circuitry found in most digital imaging devices amplifies this noise and introduces additional noise of its own [11]. Finally, when amplified signals from the CCD undergo digitization, quantization error is introduced into the image, which can be considered yet another form of noise. In most applications, it is very important to remove noise from image data, since the performances of subsequent image processing tasks are strictly dependent on the success of image noise removal operation. Noise reduction is a very challenging and complex problem due to several reasons. First of all, the nature and the characteristics of the noise signal change significantly from application to application, and moreover vary in time. The goal of denoising is to remove the noise while preserving the important image information as much as possible. Many denoising methods have been proposed over the years. M. Emre Celebi et al. [1] represents a survey of 48 filters for impulsive noise removal from colour images and also analyzed different distance measure such as Minkowski, Angular and directional-distance. Recently, several variations of median filters have been introduced [1-18].

This paper gives a detailed theoretical background on linear and non-linear filtering techniques specifically designed to address noise reduction or noise elimination process. In this paper around nine most popular noise removal techniques were implemented and compared. Results of all the algorithms are analyzed and efficiency of algorithms is calculated. Algorithms are tested using different types of images, i.e., MRI, aerial and space images etc. The performance comparisons of different de-noising filters are carried out in terms of different objective measurements.

The rest of this paper is organized as follows: in section II, sources of noise in digital images are introduced. In Section III, we discuss different types of noises which can be present in an image. In Section IV, we shall give a theoretical background of different filters used for image noise reduction and enhancement, followed by a brief description of the objective image quality evaluation metrics used to measure the performance of each filter. The performance comparisons of different de-noising filters are tabulated in VI. Section VII concludes the paper.

## 2. Sources of Noise in Digital Images

Noise usually quantified by the percentage of pixels which are corrupted. Noise generally consists of discrete pixels that are significantly different in appearance than adjacent pixels [19]. There are several ways that noise can be introduced into an image, depending on how the image has been created. For instance:

- If the image is scanned from a photograph made on film, the film grain is a source of noise. Noise may also be the result of damage to the film, or be introduced by the scanner itself.
- If the image is acquired directly in a digital format, the mechanism for gathering the data (such as a CCD detector) can introduce noise.
- Electronic transmission of image data can make noise.

## 3. Types Of Noises

Usually we know what type of errors to expect and the types of noise on the images; hence we investigate some of the standard noise for eliminating or reducing noise in images [10]. Different types of noises present in images are described firefly.

### 3.1. Amplifier Noise (Gaussian Noise)

Gaussian noise is evenly distributed over the signal. This means that each pixel in the noisy image is the sum of the true pixel value and a random Gaussian distributed noise value [5]. As the name indicates, this type of noise has a Gaussian distribution, which has a bell shaped probability distribution function given by

$$F(g) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(g-m)^2}{2\sigma^2}} \quad (1)$$

Where  $g$  represents the gray level,  $m$  is the mean or average of the function and  $\sigma$  is the standard deviation of the noise.

### 3.2. Salt-And-Pepper Noise (Impulse Noise)

An image containing salt-and-pepper noise will have dark pixels in bright regions and bright pixels in dark regions [5]. This type of noise can be caused by dead pixels, analog-to-digital converter errors, bit errors in transmission, etc. This can be eliminated in large part by using dark frame subtraction and by interpolating around dark/bright pixels.

### 3.3. Shot Noise

Poisson noise or shot noise is a type of electronic noise that occurs when the finite number of particles that carry energy, such as electrons in an electronic circuit or photons in an optical device, is small enough to give rise to detectable statistical fluctuations in a measurement [5].

### 3.4. Quantization Noise (Uniform Noise)

The noise caused by quantizing the pixels of a sensed image to a number of discrete levels is known as quantization noise [5]; it has an approximately uniform distribution, and can be signal dependent, though it will be signal independent if other noise sources are plenty that cause dithering, or if dithering is explicitly applied.

### 3.5. Film Grain

The grain of photographic film is a signal-dependent noise, related to shot noise. That is, if film grains are uniformly distributed (equal number per area), and if each grain has an equal and independent probability of developing to a dark silver grain after absorbing photons, then the number of such dark grains in an area will be random with a binomial distribution; in areas where the probability is low, this distribution will be close to the classic Poisson distribution of shot noise; nevertheless a simple Gaussian distribution is often used as an accurate model [8].

### 3.6. Speckle Noise (Multiplicative Noise)

While Gaussian noise can be modelled by random values added to an image, speckle noise can be modelled by random values multiplied by pixel values; hence it is also called multiplicative noise [5]. Speckle noise is a major problem in some radar applications.

### 3.7. Periodic Noise

If the image signal is subjected to a periodic rather than a random disturbance, we obtain an image corrupted by periodic noise. The effect is of bars over the image.

In this experiment, we have taken an image from web site as a test image. To assess the performance of different de-noising filters, salt-and-pepper noise is considered as a source of noise.

## 4. Removing Noise From Images By Filtering

A wide variety of filtering algorithms have been developed to detect and remove noise, leaving as much of possible of the pure image [10] [13] [20]. Noise reductions are basically classified into two types: 1) linear techniques and 2) Non linear techniques.

#### 4.1. Linear Filters

In linear techniques noise reduction formula is applied for all pixels of image linearly without classifying pixel into noisy and non noisy pixels. Drawback of linear algorithms is that it damages the non noisy pixels because algorithm is applied for both noisy and non noisy pixels. Examples for linear filters are average, mean, adaptive filters etc. They have a tendency to blur sharp edges, destroy lines and other fine image details, and perform poorly in the presence of signal-dependent noise [5].

##### 4.1.1. Average Filter (AF)

In average filter [5], a square window of size  $(2k+1)$  is used. Here value of  $k$  changes from 1 to  $n$ . Window size  $(2k+1)$  is taken only because window width and height must be odd so that we get exactly central pixel  $(k+1, k+1)$ . Using window, original image is scanned row wise and column wise. Each time of scan, central pixel value of window is replaced by the average value of its neighbouring pixels comes within the window.

##### 4.1.2. Adaptive Local Filter (ALF)

Adaptive filter is performed on the degraded image that contains original image and noise [5]. The mean and variance are the two statistical measures that a local adaptive filter depends upon with a defined  $(m \times n)$  window region. A variety of adaptive filtering techniques has been proposed for enhancing images degraded by noise.

##### 4.1.3. Weiner Filter (WF)

It is based on a statistical approach. The Wiener filter [13] is given by:

$$G(u, v) = \frac{H^*(u, v)P_s(u, v)}{|H(u, v)|^2 P_s(u, v) + P_n(u, v)} \quad (2)$$

Where

$H(u, v)$  = Degradation function;

$H^*(u, v)$  = Complex conjugate of degradation function;

$P_n(u, v)$  = Power Spectral Density of Noise;

$P_s(u, v)$  = Power Spectral Density of un-degraded image;

The term  $P_n / P_s$  can be interpreted as the reciprocal of the signal-to-noise ratio.

#### 4.2. Non-Linear Filters

Non linear noise reduction is a two step process: 1) noise detection and 2) noise replacement [1-18]. In first step, location of noise is detected and in second step, detected noisy pixels are replaced by estimated value. In literature so many algorithms are proposed. However, with low noise condition (up to 50% noise ratio), such algorithms work well but in high noise conditions performance of these algorithms is poor. To improve the range of noise reduction non linear techniques, such as, Median Filter (MF) [11], MMF (Min-Max Median Filter) [1], WMF (Weighted Median Filter) [9], CWMF (Center Weighted Median Filter)[15], AMF (Adaptive Median Filter) [2], PSMF (Progressive Switching Median Filter) [4], HMF (Hybrid Median Filter) [7], TMF (Tri-state Median Filter) [17] and DBA (Decision Based Algorithm) [18] algorithms are proposed.

The drawback of these algorithms is that as soon as the noise ratio increases time required to process noise also increases and takes too much time that is not suitable for real world application. To process real time videos very high speed algorithms are required.

##### 4.2.1. Median Filter (MF)

The median filter [11] is a simple rank selection filter that outputs the median of the pixels contained in its filtering window. The input-output relationship of the median filter may be defined as follows:

Let  $x[r, c]$  denotes the luminance value of the pixel at location  $(r, c)$  of the noisy input image. Here  $r$  and  $c$  are row and column indices, respectively, with  $1 \leq r \leq R$  and  $1 \leq c \leq C$  for an input image having a size of  $R$ -by- $C$  pixels. Let  $W_N[r, c]$  represent the group of pixels contained in a filtering window centered at location  $(r, c)$  of the noisy input image and having size of  $(2N + 1) - \text{by} - (2N + 1)$  pixels.  $W_N[r, c]$  is given as

$$W_N[r, c] = \{x[r + p, c + q] \mid (p, q) = -N \dots N\} \quad (3)$$

Where  $N$  is a positive integer related with the size of the filtering window and  $p$  and  $q$  are integer indices each individually ranging from  $-N$  to  $N$ . The output of the median filter is equal to the median of the pixels contained in the filtering window  $W_N[r, c]$  and is given as:

$$m[r, c] = \text{Median}(W_y[r, c]) \quad (4)$$

Although median filters preserve edges in digital images, they remove fine image details such as lines. In many applications such as remote sensing and X-ray imaging, this is exceedingly important and efforts have been made to develop filters that overcome the problem.

#### 4.2.2. Relaxed Median Filter (RMF)

The filter is obtained by relaxing the order statistic for pixel substitution. Noise attenuation properties as well as edge and line preservation are analyzed statistically [12] [16]. The trade-off between noise elimination and detail preservation is widely analyzed. Let  $m = N+1$  and  $l, u$  such that  $1 \leq l < m < u < 2N+1$ . The relaxed median filter with bounds  $l$  and  $u$  is defined as

$$Y_i = RM_{l,u}(W_i) = \begin{cases} X_{lf} X_i \in [W_i](l), [W_i](u) \\ [W_i](m) & \text{otherwise} \end{cases} \quad (5)$$

Where  $[W_i](m)$  is the median value of the samples inside the window  $i$ .

#### 4.2.3. Weighted Median Filter (WMF)

The Weighted Median (WM) [9] filter is an extension of the median filter, which gives more weight to some values within the window. This WM filter allows a degree of control to the smoothing behaviour through the weights that can be set, and therefore, it is a promising image enhancement technique.

#### 4.2.4. Center Weighted Median Filter

The Center Weighted Median (CWM) filter [15] is a weighted median filter giving more weight only to the central value of each window. This filter can preserve image details while suppressing additive white and/or impulsive-type noise. The CWM filter allows a degree of control to the smoothing behaviour through the weights that can be set, and therefore, it is a promising image enhancement technique. This approach involves a preliminary identification of corrupted pixels in an effort to prevent alteration of true pixel values. In CWM center pixel of  $(2k+1)$  square window considered as test pixel. If center pixel  $(k+1, k+1)$  is less than the minimum value present in rest of the pixel in window and greater than the maximum value present in rest of the pixel in window then center pixel is treated as corrupted pixel. Corrupted pixel is replaced by estimated value of median. Estimated value of median is calculated by sorting all element of window in ascending order and taking median of elements from  $L^{\text{th}}$  element to  $(N - L)^{\text{th}}$  element.  $N$  is the number of elements present in an array. CWM is one of the well-known order statistic filters in removing Salt and Pepper noise.

#### 4.2.5. Adaptive Median Filter (AMF)

The Adaptive Median filter (AMF) [2] is a non linear conditional filter. It uses varying window size to noise reduction technique. Size of window increases until correct value of median is calculated and noise pixel is replaced with its calculated median value. In this filter two conditions are used. First one is to detect corrupted pixels and second one is to check correctness of median value. If test pixel is less than minimum value present in rest of the pixel in window and greater than the maximum value present in rest of the pixels in window then center pixel is treated as corrupted pixel. If calculated median value is less than the minimum value present in window and greater than the maximum value present in window then median value is treated as corrupted value. If calculated median is corrupted then increase the window size and recalculate the median value until we get correct median value or else window size reaches maximum limit.

#### 4.2.6. Tri-state Median Filter

The Tri-State Median filter (TMF) [17] is a two phase algorithm. In first phase, noise pixels are identified using standard median filter. In second phase, prior knowledge of noisy pixels is used and noise pixels are replaced by Center weighted median filter.

#### 4.2.7. Progressive Switching Median Filter (PSMF)

The Progressive Switching Median filter (PSMF) [3] is a two phase algorithm. In phase one noise pixels are identified using fixed size window of  $(3 \times 3)$ . If test pixel is less than the minimum value present in rest of the pixels in window and greater than the maximum value present in rest of the pixels in window then center pixel is treated as corrupted pixel. In second phase prior knowledge of noisy pixels are used and noise pixels are replaced by estimated median value. Here median value is calculated same as in AMF without considering the corrupted pixel present in window. If calculated median value is less than the minimum value present in window and greater than the maximum value present in window then median value is treated as corrupted value. If calculated median is corrupted then increase the window size and recalculate the median value until we get correct median value or else window size reaches maximum limit.

#### 4.2.8. Decision Based Algorithm (DBA)

The Decision-Based Median filter (DBMF) [4] [18] is a two phase algorithm. In phase one noisy pixel is identified using fixed size window (3×3). In second phase prior knowledge of noisy pixels are used and noisy pixel is replaced by middle value of sorted window pixels.

#### 4.2.9. Hybrid Median Filter (HMF)

Median filters can tend to erase lines narrower than ½ the width of the neighborhood. They can also round off corners. Hybrid median filters can get around these problems. The hybrid median filter is a three step ranking process that uses two subgroups of a 5x5 neighbourhood [7]. These subgroups are drawn from pixels parallel to the image frame edges and at 45° to the edges, centred on the reference pixel. The median for each subgroup is determined. These two values are then compared to the original pixel value, and the median for these three values becomes the output value for the pixel in the filtered image. Larger neighborhoods permit the defining of additional subgroup orientations. This filter always gives at least a fourfold improvement in edge shift over that of the median filter. This filter always gives at least a fourfold improvement in edge shift over that of the median filter. Hence, such detail-preserving filters improve the situation dramatically but do not completely overcome the problem.

### 5. Objective Image Quality Evaluation Metrics

The performance of each filter is evaluated quantitatively for images with impulse noise using the following Objective Quality Metrics [20]. The ten objective measurements are selected and used for this research study. Definition:  $x_{j,k}$  denotes the samples of original image,  $x'_{j,k}$  denotes the samples of filtered image. M and N are number of pixels in row and column directions, respectively.

#### 5.1. Mean Square Error (MSE)

The mean-square-error (MSE) is the simplest, and the most widely used, image quality measurement. This metric is frequently used in signal processing and is defined as follows [20]:

$$MSE = \frac{1}{MN} \sum_{j=1}^M \sum_{k=1}^N (x_{j,k} - x'_{j,k})^2 \quad (6)$$

Where  $x_{j,k}$  represents the original (reference) image and  $x'_{j,k}$  represents the distorted (modified) image and j and k are the pixel positions of the M×N image. MSE is zero when  $x_{j,k} = x'_{j,k}$ .

#### 5.2. Root Mean Square Error (RMSE)

The Root Mean Square Error is the square root of the squared error averaged over  $M \times N$  window and is given by [20]:

$$RMSE = \sqrt{\frac{1}{MN} \sum_{j=1}^M \sum_{k=1}^N (x_{j,k} - x'_{j,k})^2} \quad (7)$$

#### 5.3. Signal to Noise Ratio (SNR)

Signal to Noise Ratio (SNR) compares the level of the desired signal to the level of background noise. Larger SNR values correspond to good quality image.

$$SNR = 10 \log_{10} \frac{\sum_{j=1}^M \sum_{k=1}^N (x_{j,k}^2 + x'^2_{j,k})}{\sum_{j=1}^M \sum_{k=1}^N (x_{j,k} - x'_{j,k})^2} \quad (8)$$

#### 5.4. Peak Signal Noise Ratio (PSNR)

The PSNR is most commonly used as a measure of the quality of de-noised image. The small value of Peak Signal to Noise Ratio (PSNR) means that image is poor quality. The PSNR is defined as:

$$PSNR = 10 \log \frac{(255-1)^2}{MSE} = 10 \log \frac{255^2}{MSE} \quad (9)$$

Where  $255^2$  is the maximum intensity of the unfiltered image. A higher PSNR would normally indicate that the reconstruction is of higher quality.

#### 5.5. Normalized Cross-Correlation (NCC)

Normalized Cross-Correlation (NCC) measures the similarity between two images and is given by the following equation. The large value of NCC means that image is poor quality. NCC is defined as follow [20]:

$$NCC = \frac{\sum_{j=1}^M \sum_{k=1}^N (x_{jk} \cdot x'_{jk})}{\sum_{j=1}^M \sum_{k=1}^N x_{jk}^2} \quad (10)$$

### 5.6. Average Difference (AD)

AD is simply the average of difference between the reference signal and test image. The large value of maximum difference means that the quality of the image is poor. AD is defined as follows [20]:

$$AD = \frac{1}{MN} \sum_{j=1}^M \sum_{k=1}^N (x_{jk} - x'_{jk}) \quad (11)$$

### 5.7. Structural Content (SC)

SC is a correlation based measure and measures the similarity between two images. The large value of Structural Content (SC) means that the quality of the image is poor. SC is defined as follow [20]:

$$SC = \frac{\sum_{j=1}^M \sum_{k=1}^N x_{jk}^2}{\sum_{j=1}^M \sum_{k=1}^N x'_{jk}^2} \quad (12)$$

### 5.8. Maximum Difference (MD)

MD is the maximum of the error signal (difference between the reference signal and test image). The large value of Maximum Difference (MD) means that the quality of the image is poor. MD is defined as follow [20]:

$$MD = \text{Max}(|x_{jk} - x'_{jk}|) \quad (13)$$

### 5.9. Normalized Absolute Error (NAE)

The large value of Normalized Absolute Error (NAE) means that the quality of the image is poor. NAE is defined as follows [20]:

$$NAE = \frac{\sum_{j=1}^M \sum_{k=1}^N |x_{jk} - x'_{jk}|}{\sum_{j=1}^M \sum_{k=1}^N |x_{jk}|} \quad (14)$$

### 5.10. Image Quality Index (Q)

The image quality index [6] is designed by modelling any image distortion as a combination of three factors: loss of correlation, luminance distortion, and contrast distortion [10]. Let  $x = \{x_i | i = 1, 2, \dots, N\}$  and  $y = \{y_i | i = 1, 2, \dots, N\}$  be the original and test image signals, respectively. The Image quality Index is defined as:

$$Q = \frac{4\sigma_{xy}xy}{(\sigma_x^2 + \sigma_y^2)[(\bar{x})^2 + (\bar{y})^2]} \quad (15)$$

Where  $\bar{x} = \frac{1}{N} \sum_{i=1}^N x_i$  and  $\bar{y} = \frac{1}{N} \sum_{i=1}^N y_i$

$$\sigma_x^2 = \frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{x})^2 \quad \text{and} \quad \sigma_y^2 = \frac{1}{N-1} \sum_{i=1}^N (y_i - \bar{y})^2$$

$$\sigma_{xy} = \frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{x})(y_i - \bar{y})$$

The dynamic range of Q is [-1, 1]. The best value 1 is achieved if and only if  $x_i = y_i$  for all  $i = 1, 2, \dots, N$ . The lowest value of -1 occurs when  $y_i = 2\bar{x} - x_i$  for all  $i = 1, 2, \dots, N$ . This quality index models any distortion as a combination of three different factors: loss of correlation, luminance distortion, and contrast distortion [6].

## 6. Experimental Results

This section deals with performance comparison of different type of filters in image de-noising for Salt & Pepper noise. Simulations are carried out in MATLAB and tested on a Core i5 2.67GHz PC with 4GB RAM. We used "Test Image" (Fig.2a) in ".jpg" format as

original image. The original image is corrupted by impulsive Salt & Pepper noise with standard deviation (0.04). De-noising of images using different linear and non-linear filters and comparisons among them are carried out in this work.

The quantitative results in terms of ten objective measurements, such as, MSE, RMSE, SNR, PSNR, NCC, AD, SC, MD, NAE and Q has been given in Table I for the test image, for impulsive salt & pepper noise with standard deviation 0.04, and the comparative analysis has been presented in Fig. 2 for our test image. Along with the figures and table some graphs, shown in Fig.3, Fig.4 and Fig.5, have also been given, for all the quantitative measures, for test image to have a quick insight into the comparative performance of the existing filters. A sample pipeline to evaluate filter performance is depicted below.

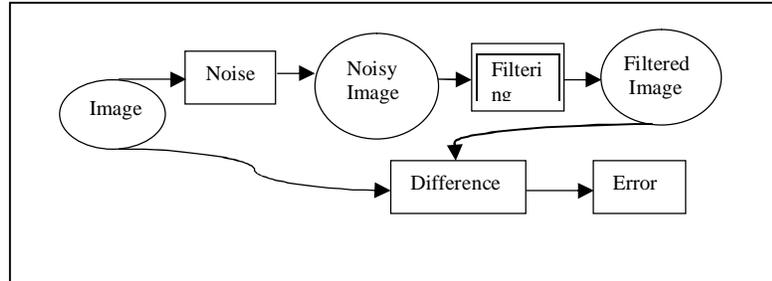


Figure 1: A Sample Pipeline to Evaluate Filter Performance

	MSE	RMSE	SNR	PSNR	NCC	AD	SC	MD	NAE	Q
<b>AF</b>	261.7391	16.1784	0.0203	23.9521	0.9722	2.8957	1.0479	172	0.0580	0.4578
<b>ALF</b>	638.5282	25.2691	0.0311	20.0790	0.9723	2.2349	1.0325	255	0.0910	0.2877
<b>WF</b>	440.3089	20.9835	0.0675	21.6932	0.9729	2.4022	1.0393	255	0.0698	0.3642
<b>MF</b>	106.0780	10.2994	0.0382	27.8746	0.9936	0.3819	1.0088	254	0.0224	0.7793
<b>HMF</b>	284.4630	16.8660	0.0229	23.5905	0.9943	0.2422	1.0007	167	0.0396	0.6821
<b>AMF</b>	272.5742	16.5098	0.036	23.7760	0.9908	0.6138	1.0083	166	0.0371	0.7315
<b>WMF</b>	280.8497	16.7586	0.0336	23.6461	0.9909	0.4544	1.0078	183	0.0383	0.7043
<b>CWMF</b>	278.0819	16.6758	0.0337	23.6891	0.9932	0.1704	1.0032	184	0.0384	0.7023
<b>PSMF</b>	150.3288	12.2609	0.1429	26.3604	0.9923	0.6803	1.0099	255	0.0309	0.7413
<b>TMF</b>	165.7999	12.8763	0.0537	25.9350	0.9908	0.6761	1.0125	255	0.0330	0.6933
<b>DBMF</b>	80.3008	8.9611	0.2139	29.0836	0.9969	0.2176	1.0032	162	0.0176	0.8253
<b>RMF</b>	107.5895	10.3725	0.039	27.8131	0.9935	0.3857	1.0090	251	0.0224	0.7798

Table 1: Performance Metrics of Different Filters Evaluated Quantitatively For Test Image with Salt & Pepper Noise with Variance 0.04

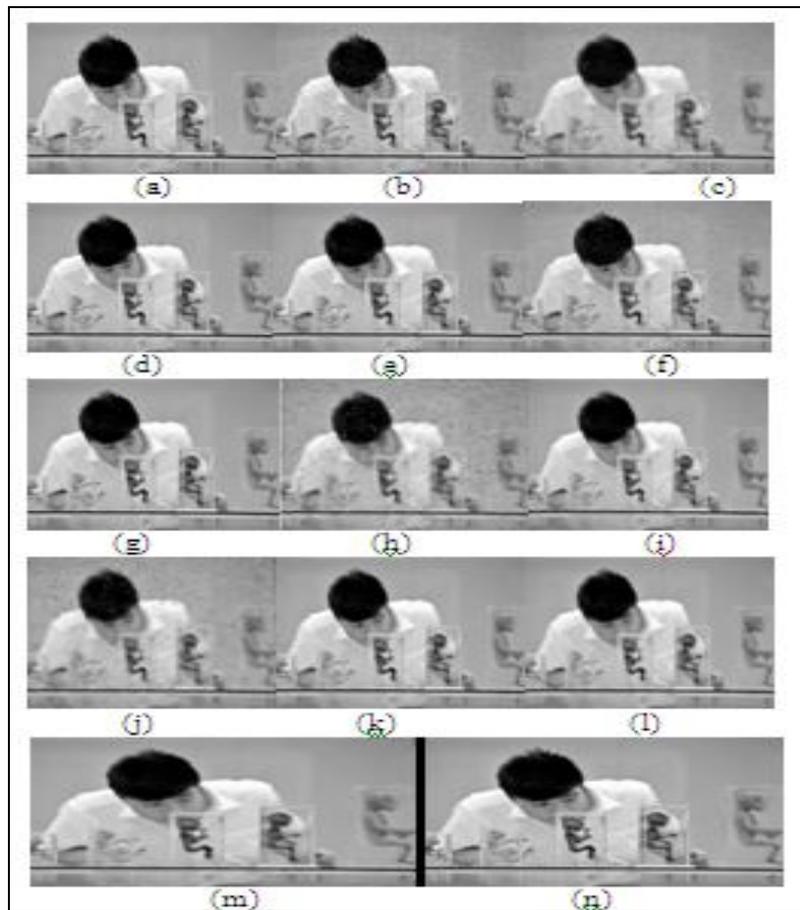


Figure 2: A) Original Image  
 B) Image Corrupted By Salt and Pepper Noise with Variance 0.04  
 C) Average Filtered Image  
 D) Median Filtered Image  
 E) Hybrid Median Filtered Image  
 F) Adaptive Median Filtered Image  
 G) Progressive Switching Median Filtered Image  
 H) Adaptive Local Filtered Image  
 I) Relaxed Median Filtered Image  
 J) Wiener Filtered Image  
 K) Weighted Median Filtered Image  
 L) Center Weighted Median Filtered  
 M) Tri-State Median Filter Image  
 N) Decision Based Algorithm

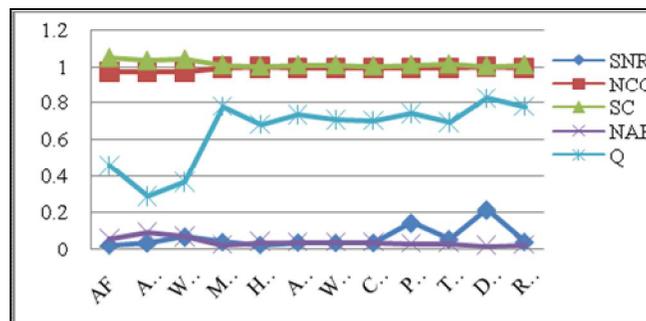


Figure 3: Comparison of Performance of Different Filters vs. [SNR, NCC, AD, SC, NAE and Q] Objective Metrics

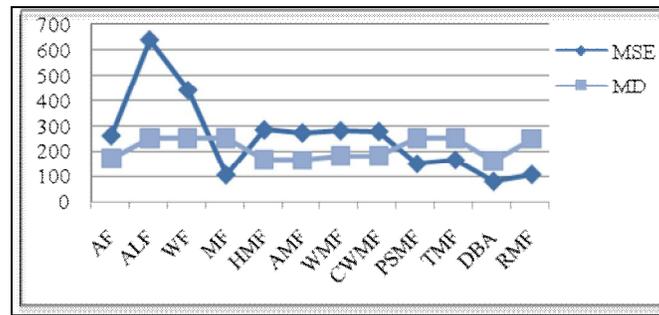


Figure 4: Comparison of Performance of Different Filters vs. [MSE & MD] Objective Metrics

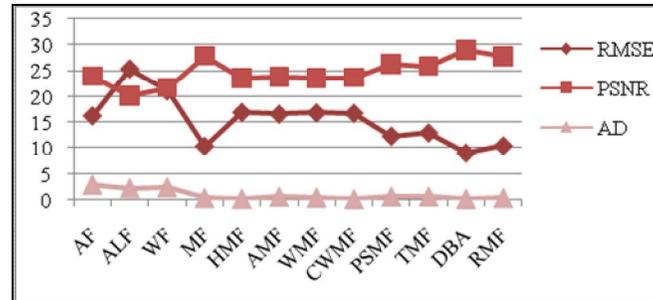


Figure 5: Comparison of Performance Different Filters vs. [RMSE, PSNR & AD] Objective Metrics

## 7. Conclusion

In this paper, we critically analyzed different filtering techniques for removing noises from an image. Furthermore, we presented and compared results for these filtering techniques. The efficient techniques of de-noising have been implemented and simulated for a test image corrupted with impulsive salt & pepper noise with standard deviation 0.04, and the comparative analysis has been presented in Fig.2. Along with the figures and table some graphs, shown in figure Fig.3, Fig.4 and Fig.5, has also been given, for all the quantitative measures, for test images to have a quick insight into the comparative performance of the existing filters.

The following conclusions can be drawn based on the obtained simulation results. In Non linear filters compared to other filters DBMF and MF process high PNSR. DBMF and PSMF process high SNR. DBMF filter gives better performance than others filters reported in this paper with respect to MSE, RMSE, PSNR, MD, NAE and Q. CWWMF, MDF, TMF and DBMF take less execution time. The results obtained using DBMF technique ensures noise free and quality of the image as well. This filter is capable of producing recognizable, patches free outputs from images corrupted by higher levels of impulse noise. Experimental results show the feasibility of the filter. This is affirmed by auditing the numerical measures like PSNR, MSE, NAE, MD, Q and visual observations. Hence overall performance of DBMF is better than other algorithms. Visual results of restored images prove the results of objective quality assessment.

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## **A Novel Method for Secured Assessment And Evaluation System in Education Paradigm**

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### **Abstract:**

*Assessment & Evaluation play a major role in Accreditation of educational institutions. Problems like leakage of question paper; coding, decoding, valuation of scripts in the present examination pattern can be overcome with scientific use of information technology. At present there is no standard tool that comprehensively addresses such factors to test the new generation of students with vast potential for learning in the electronic age.*

*This research paper proposes a novel model of multipoint secured system. Zigbee is a standard-based technology designed to address the unique needs of wireless sensor and control networks. Since Zigbee can be used in any field of knowledge - based testing, it is proposed to implement it in Assessment & Evaluation needs of higher education to maintain security and safety and to make it paper less in assessment and evaluation of students' performance. Additional advantage is to reduce space and other infrastructure used to store answer scripts for desirable duration*

**Key words:** Zigbee, Wireless Sensor, Control Networks, Security and Safety, Paper Less

### **1. Introduction**

At present, education has become wide spread and Technical education is reaching the nook and corners of the country. Introduction of Semester System beyond 10+2 level and conducting examinations frequently is posing a severe threat to secrecy and maintenance of standards in Assessment and Evaluation of students' performance, consuming large quantities of white paper besides keeping huge bundles of answer scripts for years, for revaluation and verification. Thus the load on education system is becoming higher and higher. But little attempts have been made to improve the systems at sustainable levels. One such method to overcome some of the above deficiencies is no doubt on line examination, but this is confined to areas and institutions where sophisticated computer networking is available. To overcome the deficiencies and make the technology easily adoptable, movable and workable in places where there is power shortage and power cuts and improper networking, a new system and machinery is proposed to be designed for adoption, maintaining high security, reduce paper use and storage methods.

In technical education, special stress is given to continuous analysis of students' performance throughout the term or session. Cases of malpractice like outflow of question papers and adoption of unfair practices poses serious lapses in the examination system. Though more than one set of question paper in each subject is used to lower security threats, large gap in time of sending the question paper from the University to the Colleges is giving a scope for leakage and cancellation of examinations. Similarly impersonation also poses a threat in evaluating genuineness of the candidates' abilities. To overcome such security lapses, impersonation and to make it paperless and avoid its storing in evaluation system, e-pen and e-notebook are proposed. Avoiding storage of used stationary for years helps to reduce not only costs but also health hazards due to filing and storing the question papers and answer sheets for years.

## 2. Importance of This Research

The fundamental aim of this research work is to develop an analytical engine to design a secured data transmission system by using Zigbee technology and display the parameter on a notebook computer at multipoint screens using serial communication where both synchronous and asynchronous transmissions are supported. These operations can also be controlled if needed by using a micro controller at receivers for performing respective tasks efficiently.

Compared to other wireless protocols, the Zigbee wireless protocol offers lower complexity, reduced resource requirements and most importantly, a standard set of specifications. It also offers three frequency bands of operation along with a number of network configurations and optional security capability.

## 3. The Novel Methodology

The Research Work Proposed in this paper can reduce the Exam-paper consumption and can develop the flexibility of circulation of instructions in a better way. This device can be handed over to all the staff in the office and so the notification can be circulated easily. This device will be connected through RF. Hence so no mobile signals are required and we can reduce mobile communication in the corporate. If this technology develops, we can soon expect a paperless exam, it can also have best secured exams with minimum cyber corruptions. As shown in the Fig.1, As every student attends the exam with this device, he will be logging into his account and as this involves only a neural network and not a web server, hence nobody can hack it.

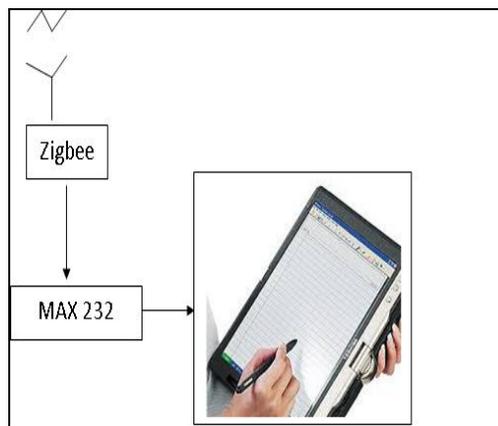


Figure 1

The question paper (Objective Type/ Descriptive Type) will be displayed over the device and after answering the question with e-pen (with a confirmation) the answer will be immediately sent to the invigilators' systems. Here we transfer the secured data from transmitter collected by the micro controller through serial communication and transmitted to the receiver section through wireless medium.

## 4. Results & Conclusion

This research work helps to improve security, reduce paper consumption, develops flexibility for conducting examinations in odd circumstances and in remote places with less power and battery backup, using e- pen and e-notebook. Evaluation can be done without any additional investments and by using the existing systems available in the laboratories in the educational institutions.

## 5. Future Outlook

Through developing this technology, we can soon expect a secured and paperless examination system in India. For administrators, it is low cost, simple, secure and an effective method, which can definitely reduce examination and evaluation period.

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## The State of Art: Smart Cities in India: A Literature Review Report

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### Abstract:

*The Smart Cities can be abbreviated as Sustainable Management Action Resource Tools for Cities. Smart cities' is the latest concept when it comes to building the cities of the future. Smart cities are expected to be the key to combining sustainable future with continued economic growth and job creation. This paper emphasizing a review on "The State of Art – Smart Cities creation in India" based on some scholastically reviewed research articles and online databases. More over this paper discussing about smart cities - concepts, operational definitions, dimensions, technologies that are driving and finally four Indian smart cities.*

**Key words:** smart city; smart environment; smart governance; smart people; smart mobility; smart economy; smart living

### 1. Introduction

Globalization, with trade liberalization measures and fast technological changes altering the relations of production, distribution and consumption, has very substantial effects on city development. As one important consequence (network-) economies evolved" [...] with easier physical movement, globalized players making decisions with no regard to national boundaries" (Thornley, 2000). Cities around the world aspire to provide superior quality of life to their citizens. Furthermore, many are also seen as centers of unique opportunities, like business, fashion, entertainment and governance, for their citizens. Cities want to retain such preeminent positions or re-position themselves for newer opportunities. But, resources needed to reach and sustain such aspirations are decreasing while the expectations continue to rise from an increasing population-base. A positive trend of the internet age is that more data than even before is open and accessible, including from governments at all levels of jurisdiction, which enables rigorous analysis. Wellington E. Webb - Former Mayor of Denver, Colorado said that about cities

"The 19th century was a century of empires;

The 20th century was a century of nation states;

The 21<sup>st</sup> century will be a century of cities"

Cities play a decisive role, not only in Denver-Colorado but throughout the world. Cities are driving the economy. Cities are where people want to live, invest and work. That is why cities are focal points in the future sustainable economy (Claus Bjorn Billehoj, Sustainable City Development, Municipality of Copenhagen). There are numerous definitions of the term 'city' depending on countries, but the most common one defines 'city' as a relatively large and permanent settlement. Paul R Brown, AICP, CDM Smith Executive Vice President defined that "Cities are complex ecosystems that are dependent on natural systems, challenging out thinking about the development of both natural and urban environment".

### 2. Smart Cities

Mitchell's (1995) book on the City of Bits sets out a vision of urban life literally done to bits, left fragmented and in danger of coming unstuck. Mitchell's (1999) next book on e-topia provides the counter-point to this vision of urban life and scenario where the city is no longer left in bits and pieces, but a place where it all comes together. As Mitchell's (2004) states in his more recent book: ME++: the Cyborg-Self and the Networked City, all this coming together is possible because: 'the trail separation of bits and atoms is now over' and this post-AD 2000 dissolution of the boundaries between the virtual and physical is what makes everything worth playing for (p.3). The first concerns the proliferation of cities that adopt intelligent city strategies and define themselves as smart or intelligent cities. Since 2005, when Urenio Watch ([www.urenio.org](http://www.urenio.org)) began recording developments in the field of innovation ecosystems and intelligent cities, the increasing announcement and diversity of cities announcement and diversity of cities adopting intelligent city

strategies has been noted. This has often led to a simplistic use of the terms 'Smart' and 'Intelligent', which are easily assigned to any digital application associated with cities-often just for marketing purposes-without making clear what intelligence is being improved and how Holland's (2008) accurately pointed out that urban development in many countries has been increasing influenced by smart city concepts, but despite the wide use of this urban labeling phenomenon, we now little about so called smart cities.

The Cities that Think for you are also calling as Electronic Cities, I(Internet) Cities, Cyber Cities, Connected Cities, Wired Cities, Ubiquitous Cities, Intelligent Cities, Semantic cities, Transparent Societies and Digital Societies or Digital Cities. This is a new paradigm on how to build cities, which requires new strategies, technologies, models and urban processes in order to meet the current challenges related to quality of life, balance of the environment and efficiency of natural resources, to inequality and social exclusion. Smart cities, digital cities and intelligent cities are concepts that have characterized recent academic literature. Smart Cities have been gaining popularity among researchers and practitioners. Smart Cities constitute a major breakthrough in contemporary urban development and planning literature, which spans over a period of 20 years. The first academic paper on intelligent cities appeared in 1992 (Laterasse, 1992), while the first academic paper on smart cities was also published in the same year (Gibson et. al, 1992).

### 2.1. Definitions

The term "smart cities" is a bit ambiguous. Some people choose a narrow definition - i.e. cities that use information and communication technologies to deliver services to their citizens. Some people prefer a broader definition: Smart cities use Information and Communication Technologies (ICT) to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint - all supporting innovation and the low-carbon economy, accessed on 18/08/2013 (<http://www.fastcoexist.com/1679127/the-top-10-smart-cities-on-the-planet>). A city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens (Hall, R. E, 2000).

### 2.2. Dimensions

Cities development presently depends not only on the city's endowment of hard infrastructure (Physical Capital) and social infrastructure (Intellectual and Social Capital) but also on the availability and quality of ICTs (Information and Communication Technologies). The ICT Form of capital is decisive for urban competitiveness. Based on this background the concept of the "smart city" has been introduced as a strategic device to encompass modern urban production factors in a common framework. Smart Cities outlines many of the opportunities for cities afforded by these contemporary technologies, indicating how the 'smart city' approach might fundamentally transform the way that cities are governed, operated, interacted with and experienced. Smart Cities can be identified along six main dimensions (IBM Smart Cities: [www.ibm.com/uk/cities](http://www.ibm.com/uk/cities)), (Giffinger, R et al, 2007). These axes are

- Smart Economy - Innovation and Competitiveness
- Smart Mobility- Transport and Infrastructure
- Smart Environment - Sustainability and Resources
- Smart People - Creativity and Social Capital
- Smart Living - Quality of Life and Culture
- Smart Governance - Empowerment and Participation

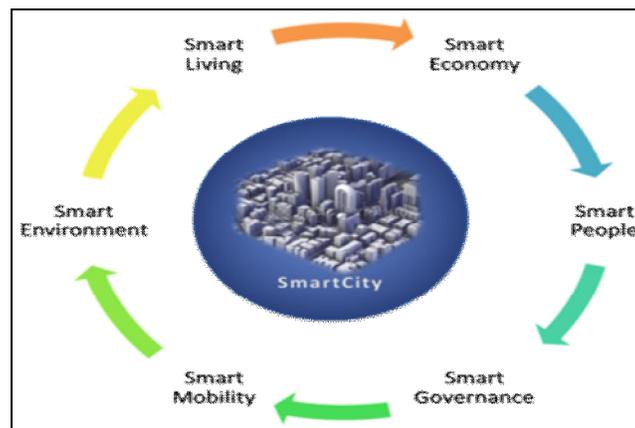


Figure 1

### 2.3. Technological Agents

"The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it" - Mark Weiser.

Digital technologies captures, stores, analyses, manages, and presents data that is linked to a particular location and helps in resource management, asset management, archaeology, environmental impact assessment and urban planning. These digital technologies introduced in the very fabric of the city space is inflicting fundamental changes on the connection between the city and its inhabitants. At the same time it is making the hidden layers of social, economic, political processes and environmental, tensions, and flows transparent and visible in ways that were never possible before. Cities are made up of huge networks of people, organizations, businesses, infrastructure, consumption, energy, spaces and last but not least with technologies. In a Smart City, these networks are linked together, supporting and feeding off each other. The process of linking the many different networks of the city together in a system presents a number of technological as well as governance-related and social challenges. Starting with the technological challenges, most of the solutions which are needed in a Smart City have already been developed (Urban World: Mapping the Economic Power of Cities. McKinsey Global Institute 2011). Solar panels, smart home appliances, electric vehicles, wind turbines, smart grids, building management systems etc. all have the potential to become part of the Smart City. Being a smart technology, however, is not just about using less energy or being made of smart and reusable materials. It is about being able to function as an integral part of a larger system. The problem therefore lies not so much in the individual technology, but in fact that Smart Cities demand that this technology should be integrated into a system which knows as an IoT.

#### 2.3.1. Gather Data

First of all, being a type of Smart City technology means being able to constantly gather information about the city which can be used by the technology itself in order to adapt to the most sustainable and smart behavior. An Ex. of this is a Smart Building System, which constantly gathers data about performance of a building, which it then uses to optimize energy use.

#### 2.3.2. Communicate Data

Secondly, It should also be able to share that data with people or things (Objects) or other technologies or borrow relevant data from elsewhere. In this sense, smart technology should be able to communicate with the rest of a Smart City system. For this to be the case, it needs to be able 'speak the same language' as the other devices in the Smart City system. Furthermore, it needs to be connected to a common communicative platform where information can be shared and interoperability can be promoted (e.g. a smart grid).

#### 2.3.3. Multi-Functional

Thirdly, although technology which is able to gather data and communicate with other technologies is indeed smart, truly smart technologies are multi-functional. This means that they provide solutions to multiple problems. One Ex. could be the electric vehicle. This not only leads to less congestion; in connection with a smart grid it can also serve as an energy buffer, which would help level out the energy supply and demand curve.

Cities are adopting smart technologies for different reasons: Amsterdam to reduce its carbon emissions, Tokyo to become more competitive, and China to tackle its resource scarcity. Elsewhere, South Korea is using cities like living labs to help domestic companies drive growth in other markets, specifically in India and China. In every case, the smart city is the beginning of initiatives that will drive big changes on the earth over several decades. "The city is a relatively manageable entity when compared to the earth," says Ynse de Boer, who leads smart city projects for Accenture in Asia-Pacific. A smart city relies, among others, on a collection of smart computing technologies applied to critical infrastructure components and services (Hafedh Chourabi et al, 2012).

Smart cities use Internet of Things (IoT) technologies to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint-all supporting innovation and the low-carbon economy. The main advantages of creation of smart cities are Smart Grid, Prevent Fires, Digital Governance, Waste Management, Water Management, Surveillance Security, Land – Use Planning Changes, Intelligence Transportation, Regional Green Cities, Quality of Urban Citizen Life Improvement, Smarter places to Visit, Live, Work and Play, Sustainable Development through Innovation Cities and finally which leads to for the nation's Economic Growth. The Internet of Things (IoT) enabled users to bring physical objects into the sphere of cyber world. This was made possible by different tagging technologies like NFC (Near Field Communication), RFID (Radio Frequency Identification) and 2D (2-Dimensional) barcode which allowed physical objects to be identified and referred over the internet (Faisal Razzak, 2012).

### **3. The State of Art**

According to IBM's report from the IBM Institute for Business Value, "A Vision of Smarter Cities", in the next 20 years, for every minute, on an average 30 Indians will migrate from rural areas to smarter cities for their livelihood. So as per this prediction, India needs ([http://www.ibm.com/smarterplanet/in/en/sustainable\\_cities/ideas/](http://www.ibm.com/smarterplanet/in/en/sustainable_cities/ideas/)) to create 500 new cities in the forthcoming 20 years. In addition to this according to a study by consulting firm of Booz & Company also an average of 30 people will move from rural areas to the city for every minute in India, so the country is set to build 500 new cities over the next 20 years to house 700 million more city dwellers by 2050, ([www.thecitiesoftomorrow.com/news/india-smart-cities](http://www.thecitiesoftomorrow.com/news/india-smart-cities)).

Establishing two smart cities in each of India's 28 states in the country under phase II of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM): that is the goal of the wide-range in project introduced by the Indian government to inject smart technology into cities home to between 500,000 and one million people an ambition that goes hand in hand with seven other smart-city projects already underway. The smart cities project is not meant for metropolitan cities. It is for smaller cities with half a million to one million population cities like Ujjain, and Jabalpur, as officially cited. Bigger cities are already covered under other schemes.

According to 2011 census, about 32% of India's population lives in urban areas. It is projected to grow and reach 40% in a decade and 50% in about 30 years. The JNNURM was launched in 2005 by the Government of India to last for a period of seven years.

Upgrading social and economic infrastructure in cities, provision of basic services to urban poor, introducing reforms to strengthen municipal governance are the principal strategies adopted in this JNNURM mission. The aim of the Mission is to encourage reforms and fast-track planned development of identified cities. The Mission also focuses on inclusive growth of cities with safe drinking water, improved public transport, sustainable environment, and standardized service level. Community participation in urban local bodies is also part of the mission. One of the basic reasons for investments flocking in to the smaller cities is available properties and affordable prices. Moreover, the special initiatives taken by the respective governments in providing the smaller cities with infrastructural facilities and creation of SEZs, has played a vital role in promoting these small towns into cities of the future. Keeping in view all the congenial factors necessary for setting up corporate infrastructure, the investing companies ranging from pharmaceuticals to financial institutions, automobiles to the IT & ITES (IT-Enabled Services) sectors; to the retail and real estate sector are opting for the smaller cities transforming them into India's fastest growing cities in a matter of few years.

### 3.1. Lavasa

The dream of India's first smart city is now inching closer to reality in Lavasa. It is a private, planned city being built near Pune. Touted as India's first smart city, My City Technology– a joint venture set-up by Lavasa Corporation and Wipro – signed a definitive agreement for Cisco who is the giant of networking technology to participate in its development. According to The Wall Street Journal, among the digital experiences, Lavasa homes will offer are touch panel automation, occupancy-based lighting, door sensors, motion sensors, beam detectors and on-call transport services. The city is boasting of City by assets tracking automatically through RFID tags, all residential & buildings are connecting by secure IP, networking technologies to help centralize management operations, logistic supply centers boasting of roads, airport, rail, dry dock and operation centre and smart transportation and JIT delivery.

### 3.2. GIFT (Gujarat International Finance Tec-City)

Designed as modern recreation of India's architectural past, mirrored twins of the Gateway. It will house over a million people with millions more commuting there daily. Well placed between the political and commercial capitals of Gujarat. GIFT is a public-private partnership, it will India's first major super tall Central Business District project that is designed to be the focal point of both the world's and India's booming financial services market by providing companies with all those things Mumbai is still developing: comprehensive infrastructure, power, virtualized office space, a well designed, planned & expandable urban form.



Figure 2

### 3.3. Kochi

Smart City Kochi is an IT Special Economic Zone under construction in Kochi, Kerala (Framework Agreement. kerala.gov.in, 2007), (Agreement reached on Smart City project. Thehindu.com (2011-02-02)). Smart City (Kochi) Infrastructure Pvt. Ltd. is a joint venture company formed to develop the Kochi Smart City project. Government of Kerala (16% share), TECOM Investments (84% share), a subsidiary of Dubai Holding are the main investors of the company. "The four-storeyed building project of 22 lakh sq. ft. spread over 50 acres will be located on the banks of Kadambra at Edachira near Kakkanad. The project will be ready in two years timeframe". From this the NASSCOM forecast that the Indian Information Technology (IT) industry will exceed \$300 billion by 2020.

### 3.4. Bangalore

Prof. em. Dr. techn. Jörg Schönharting said that Bangalore is going to be a Smarter City through an Indo-German-Research Project mainly via Smart Mobility including (Noise, Pollutants); (E-Mobility, Car Sharing); (Information, Traffic Management); (Walkability, Distances, Modal Split); (High Occupation Rate); (Smart PT, Linkage with Private); (Safety, Accessibility, Costs); (Energy Efficiency). The Government of Karnataka has inked an agreement with networking solution provider Cisco for a pilot programme to develop the roadmap for an intelligent, smart and sustainable Bangalore city. The pilot programme would aim at developing replicable ICT solutions to help promote sustainable, intelligent urban development practices in the city. The company also unveiled its blueprint for "Intelligent Urbanization," a global initiative to help cities around the world use the network as the next utility for integrated city

management, better quality of life for citizens and economic development. Bangalore's traffic police departments that are beginning to employ smart technologies. They have 180 cameras around the city managed from a control room.

#### 4. Conclusion

In India, administration in the cities are often confronted with a multitude of key problems, like unplanned development, informal real estate markets, inevitable population growth, lack of infrastructure, inadequate transport facilities, traffic congestion, poor power supply, in competent health services, and lack of basic services both within the city and in the suburban areas, poor natural hazards management in overpopulated areas, crime, water, soil and air pollution leading to environmental degradation, climate change and poor governance arrangements are leading the urban citizen life in unhappy. So we plan and build the smart cities in view of resolving these problems.

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## Exploring the Effectiveness and Reach of Mobile Marketing: An Indian Perspective

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### **Abstract:**

*Mobile Marketing refers to the use of the mobile as a medium for marketing communication. Today mobile has become the second shadow of customers. It is the extension of their lifestyle. Mobile channel allows companies to reach a wide range of people, at the same time directing the communication to a targeted audience. Marketers should understand the importance of overall customer experience and try to take the advantage of exploding growth of mobile market. The overall customer experience can be identified by different parameters like awareness, consideration, intent and support which may lead to loyalty and advocacy. These parameters are explained by the concept of 'customer hourglass'. The study explores the effectiveness of mobile marketing by analysing a few case-studies on the customer hourglass and examines the preparedness of the Indian audience specially the youngsters and media people.*

**Key words:** Mobile Marketing; Customer Hourglass; Effectiveness of Mobile Marketing; Reach of Mobile Marketing; Mobile Marketing in India

### **1. Introduction**

Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large. In the words of Peter F. Drucker, "The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself." It is not about who can talk faster, or close better. It is about deep psychological understanding of customer needs. Marketing is used to identify the customer, satisfy the customer, and keep the customer. For business to business marketing, it is creating value, solutions, and relationships either short term or long term with a company or brand. It generates the strategy that underlies sales techniques, business communication, and business developments. It is an integrated process through which companies build strong customer relationships and create value for their customers and for themselves.

The value can be created when the marketers have good understanding of customers and their lifestyle. Today mobile has become an extension of their lifestyle and also relatively effective than other advertising media (Figure 2). It addresses all the requirements of an advertiser (Figure 3) and has ability to integrate with existing communication. Today mobile devices are becoming the primary tool through which customers are accessing the internet. They now expect to view sites in a mobile ready format. Customers use mobile devices to find information quickly with a specific objective in mind. Demographic trends and new technologies such as mobile payments will accelerate the trend towards smart phones as the primary platform for customer engagement. Mobile marketing is now conventional and is rapidly becoming the primary medium through which customers view the businesses. Mobile marketing involves communicating with the consumer using mobile device. It can send a marketing message; generate visibility, awareness, engagement or loyalty. It offers ubiquitous reach and can be targeted specifically to an individual.

Mobile marketing can also be defined as "the use of the mobile medium as a means of marketing communication" or "distribution of any kind of promotional or advertising messages to customer through wireless networks". How good a marketing campaign depends on how well we harness the potential of this powerful communication medium. Therefore it can also be defined as: "using interactive wireless media to provide customers with time and location sensitive, personalized information that promotes goods, services and ideas, thereby generating value for all stakeholders".

## 2. Review of Literature

Businesses of every size are targeting customers with smart-phones as the primary communications medium. Mobile is the primary vehicle for reaching consumers through social media. Many of the popular and big brands are going mobile because of the personalization factor. Contrary to what people think mobile marketing has gained a lot of popularity amongst the consumers. According to Borrell Associates statistics, more than half a million apps are downloaded every hour and the average smart-phone user has 22 of them. The average smart-phone users spends 2.8 hours per day using apps and 3 in 5 people first turn to an app before searching the Web, says Mobclix<sup>1</sup>.

Leppaniemi et.al. (2006) has accomplished several studies to explore mobile marketing practices and define processes. Varnali (2010) has carried out the research on mobile marketing characteristics. Karjaluoto's (2007), Mirbagheri have thrown lights on mobile marketing strategy. Carter describes mobile marketing as "a systematic planning, implementing and control of a mix of business activities intended to bring together buyers and sellers for the mutually advantageous exchange or transfer of products where the primary point of contact with the consumer is via their mobile device" (Carter, 2007, p.62).

In the year 2006, the Mobile Marketing Association (MMA) established a definition describing mobile marketing as "the use of wireless media (primarily cellular phones and PDAs) as an integrated content delivery and direct response vehicle within a cross-media marketing communication program" (Karjaluoto, 2007, p.11). It suggested push and pull strategies for marketing communication and had no evidence of customer participation and active engagement in dialogue between company and customer. Thus, MMA carried out the other definition, which explains mobile marketing as "a set of practices that enables organizations to communicate and engage with their audience in an interactive and relevant manner through any mobile device or network" (MMA, 2009).

These studies have explained that concepts like consumer culture, lifestyle, and brand identity play a great role in successful roll out of mobile marketing. Understanding these concepts help in knowing the trends and new generation consumers well. Holt, 2002 (p.80) has defined consumer culture as an ideological infrastructure that undergirds what and how people consume and sets the ground rules for marketers' branding activities. The main characteristics of consumer culture are: global marketing, growing importance of materialism among new consumers, the fast pace of revenue in fashions of every kind and change in personal identity where the latter implies different personal roles and lifestyles for consumers (Arnould, Price, Zinkhan, 2004, p.102). Today consumers are more knowledgeable and aware of different products and brands because of marketing and branding efforts by the companies. Because of this greater awareness of consumers the traditional branding techniques lose their effectiveness. This process has led to consumer focused resolutions that generated new brand paradigms in the today's consumer culture. The paradigms require looking briefly into postmodern and post postmodern consumer culture (Holt, 2002, p.80).

Today's consumer culture that started in 1960s is referred to as 'Post-modern' theory. Postmodernism specifies the importance of the age of symbol and performance and implies the concepts of hyper-reality, fragmentation, reversal of production and consumption, decentred subject, juxtaposition of opposites. Hyper-reality refers to the process where consumers realize, establish and live the simulation where images, symbols and ideas are represented. The emergence of cyber-culture and new technologies has accelerated hyper-reality and offers possibilities to produce, manipulate and experience the meanings of signs. Another significant characteristic of postmodernism is multi-fragmented realities in consumer's lives – various different expressions of symbols and meanings can exist for a consumer, therefore, a consumer doesn't strive for one unified meaning in life. In postmodernism, consumption is considered more important than production. The focus of the postmodern consumer culture is to put on meanings, symbol exchange, social expressions and relationships that are coded and decoded in the mutual process. Venkatesh, Firat (1995) say; it is not brands, which consumers are loyal to, it is symbols and images that they produce while consuming.

Consumers are engaged in multiple lifestyles and endorse numerous value systems that eventually make them immune to disorganization and mixed value systems (Berner, 2003, p.4). They have different roles in life; therefore, each consumption experience is different and satisfies individual needs. This leads to market expansion for companies to create more and more specialized (or niche) products/services (Venkatesh, Firat, 1995, p. 256).

To communicate well to these individualistic consumers new age media can be very useful; provided the technology, the different channels of communication are used effectively. Via Internet, consumers can virtually bond with their peers and online conversations about consumption experiences can imply both individualism and be adherent to the particular communities (Simmons, 2008, p. 303).

Kotler states that today's marketing can be described as "the age of participation and collaborative marketing" and is named Marketing 3.0. It is described as a value-driven marketing, claiming values as the key marketing concept and the new wave technologies (including mobile marketing) as the enabling forces (Kotler, 2010, p.4).

In the age of participation, consumers generate their own ideas, news and entertainment, as well as consume them. Technologies allow people to develop from consumers into prosumers and also connect consumers towards communitization or in other words – tribalism. That means many-to-many interaction and collaboration (Kotler, 2010, p. 33). This collaboration can imply customer involvement in a product design process or even in strategic management. The research by Chang (2009) reveals that the value of self-designed products or customer contribution in a company's operations may be ascribed to both utilitarian (e.g. functionality, convenience), as well as hedonic (emotional) benefits like expressing individuality connected with an end product. Nevertheless, to maintain and

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<sup>1</sup> Mobclix (www.mobclix.com) is the industry's largest mobile ad exchange network via its sophisticated open marketplace platform and comprehensive account management

enhance customer satisfaction and involvement level, the design/participation process has to be easy accessible and understandable by customers (Chang, 2009, p.148).

“Brands will be more valuable if they offered not as cultural blueprints, but act as cultural resources, as useful ingredients to produce the self as one chooses” (Holt, 2002, p. 83). The significant attribute for a brand is to act and make a brand “human” by empowering consumers to play part in a company’s operations and brand building (Ind, 2005, p.202). Today’s consumers, referred to as generation Y are tech-savvy and tech-intelligent i.e. comfortable with technology and using collaboration tools in their everyday life (multimedia, mobile phones, instant messaging, Internet, online banking etc.). As per Reisenwitz, Iyer (2009), they are fashion, trend and brand conscious and socially responsible, idealistic and interested in society’s well-being. They like engagement in communities, organizations, NGOs and they have showcased brand-switching behavior. So the branding efforts are more challenging.

When considering generation characteristics, it is also important to look for the future possibilities and the next generations. Marketers have named the next generation as “tweens” or logically – Generation Z, which represents those born in mid-1990s till late 2000s. This generation requires 24/7 interaction with companies; thus, firms are bound to have instant communication to demonstrate their efforts towards being authentic and original (Ind, 2005, p.218). It has grown up already using different electronic devices and is used to a vast range of brand communication tools, therefore, understands and is aware of companies’ efforts to promote products and services. Generation Z creates their own content and chooses which brands they want to consume. Hence, companies are dependent on this new generation and have to provide a possibility to collaborate with consumers to generate experiences, products/services that are important to them. Networks, social media, mobile technologies and online communication are crucial for Generation Z (Cross-Bystrom, 2010).

Mobile marketing campaigns can be integrated in a marketing communication mix, which includes a variety of different channels and messages – also called cross-media marketing (Karjaluoto, 2007, p.13). It also works as a supporting interactive technique to engage consumers in company’s activities or to create awareness of the campaigns. The response rate is high enough for marketers to gather results of campaigns, thus, this channel can be used for evaluation and research methods (Mirbagheri, 2010, p.176). Cost-effectiveness is another attribute of mobile marketing due to the possible viral marketing, word-of-mouth marketing presence in campaigns (p.176). It is also stated that mobile devices are with customers all day long, thus, it pays off to invest in mobile marketing campaigns (Altuna, 2009, p.44).

The critical factors for mobile marketing include; content – must be relevant, informative and entertaining; credibility- consumers’ perception of trustworthiness; customization and personal communication with particular target audience (Vatanparast, R. Butt, A., 2010, p. 39). The credibility factor in nowadays consumer culture indicates that customers are aware of company’s commercial intentions and, thus, knowingly engage in a company’s initiatives.

There are three basic modes of mobile marketing communications: advertising, sales promotion and direct marketing. Customer relationship marketing should also be taken into consideration even though it is not a promotional tool (Leppäniemi, 2008, p.54). The mobile growth is exploding. The traditional purchase funnel (awareness, interest, and sale) is outdated. The customer hourglass (Annexure 1: Figure 1) takes care of the overall customer experience. The customer hourglass includes awareness, consideration and intent which occurs before ‘purchase’ and support, loyalty, advocacy which occur after ‘the purchase’ has been made. It is important to address all six of these components when coming up with a strategy.

### **3. Objective of the Study**

The objective of the study is to highlight and restate the significance and importance of mobile as a tool for marketing by analysing different case-studies on the concept of ‘customer hourglass’. The study is also trying to examine the reach and efficacy of mobile marketing in the Indian market place.

### **4. Methodology**

The methodology includes primary and secondary research. The various literature, websites, cases and articles were referred to explore the efficacies of mobile marketing. In-depth interviews are conducted with media personnel to identify the nuances of mobile marketing campaign. A structured questionnaire was floated across emails and Social Networking sites like Facebook and Twitter for collecting the data to examine the reach and readiness of target audience.

#### *4.1. Tool Used To Float Survey*

Google Docs

#### *4.2. Target Audience (TG) and Sample Size*

100; Media people, Students in and around Mumbai.

### **5. Analysis and Findings**

The use of mobile made by different organizations in their marketing efforts are analysed on different parameters of ‘customer hourglass’ to understand the importance and effectiveness of the mobile marketing.

### 5.1. Awareness

It refers to making people aware that you have something to sell. Airport retailers purchase 'location-aware advertising' on GateGuru to drive users into stores. The north Face utility app Snow Report (and Trailhead) reach its target demographics through mobile updates. Snow Report users view weather and snow updates, as well as tweets from and about their favorite resorts. Nestle Purina has built a pet-friendly utility app. Purina created a location-aware database of pet-friendly places in the US to increase brand awareness and affinity. The application provides pet lovers with a simple tool to find the closest and most popular pet-friendly places in the United States in various categories, including lodging, dog parks, beaches, restaurants, travel, services and events.

### 5.2. Consideration

It refers to Use of QR codes to help prospects with their purchasing decisions. PlaceCast sends opt-in ShopAlerts based on virtually bounded target areas. After opting-in to ShopAlerts, consumers receive discount alerts based on "geo-fenced," or virtual boundaries. All of this is powered by Placecast's ShopAlerts, which are location-triggered mobile text messages sent from brands to consumers. Consumers can opt-in to receiving text messages in a variety of ways—at the store, online, via text-message, mobile websites or on Facebook.

With Tiffany's app, users can browse rings, learn about settings, save favourites, and determine a ring size. The application features a Ring Sizer that lets users determine their size by placing an actual ring directly on the screen and using the slider to align the circle with the inside of the ring.

### 5.3. Intent

It reduces friction and allows purchasing to happen from simple clicks. Point of purchase is no longer limited to a physical location nor is it limited to the time of purchase. At 'rockymountainbride.com', target shoppers create wedding and baby shower registry lists and share. The organization says "As our guests increasingly turn to their mobile phone as a virtual shopping assistant, we recognize the importance of creating innovative solutions that enable them to interact with Target anywhere and anytime."

Barcode Scanning: Guests can scan product barcodes with their iPhone camera to receive product information (pricing, ratings and reviews, and availability) while at home or shopping in a Target store. They can also add items to a Target List or gift registry.

### 5.4. Support

This step thinks of the whole customer life cycle. It does not allow stopping at point of purchase but keeps it going. In 2009, USAA was the first bank to launch a mobile banking app with check deposit by scan functionality. "We're essentially taking an image of the check, and once you hit the send button, that image is going into our deposit-taking system as any other check would," said Wayne Peacock, a USAA executive vice president.

Customers will not have to mail the check to the bank later; the deposit will be handled entirely electronically, and the bank suggests voiding the check and filing or discarding it. But to reduce the potential for fraud, only customers who are eligible for credit and have some type of insurance through USAA will be permitted to use the deposit feature. Mr. Peacock said that about 60 percent of the bank's customers qualify. In aviation industry the mobiles can do wonders. Delta flyers board with e-boarding passes. The app allows flyers to check-in, use e-boarding passes, receive text alerts, rebook and cancel flights, and share flight details with family/friends. Apple itunes users can request roadside assistance via AAA app.

### 5.5. Loyalty

Loyalty programs of the past are based on long term commitment and total potential spending value. Knowing your customers well is very important for the loyalty program. Starbucks partners with Foursquare to offer barista badges and drink discounts to Mayors. Kraft's top selling iFood app keeps cooks coming back with recipes, coupons, and sharing features. A top paid selling app, users come back for new recipes and Kraft coupons. In addition, Kraft gathers user data to understand customer behaviours and preferences.

### 5.6. Advocacy

It deals with spreading the message. This is the lowest cost –yet highest trusted form of marketing. When done correctly, this fuels the top of the marketing funnel, growing the program over and over. Tasti D-Lite rewards brand advocates with points that translate into free products. Tasti D-Lite customers earn TastiRewards every time they make a purchase using a rewards card that can automatically trigger updates to Facebook, Twitter, or Foursquare accounts. When the bottom half of the customer hourglass is done correctly, it fuels the top half.

These cases in various industries at each level of the customer hourglass help in better understanding of the efficacy of the mobile marketing and application of the concepts. To reinstate the fact the customer responses are analysed to understand the usage of mobile and preparedness for mobile marketing campaigns.

The target audience were quizzed about which smart phone OS they prefer. Collected data inferred that Android OS seems to have the largest slice of the market pie with a soaring 42%. It seems to be the best smart phone OS money can buy. This was attributed mainly to its open source architecture making it easy for developers to create a sizeable market with a range of apps from common utility to business apps. Blackberry was second most popular smart phone used by the target audience. This could be attributed primarily to its good marketing campaigns like the ever so popular blackberry ads. Surprisingly, iOS only has a share of 12 % amongst the audience. This might be due to its steep price. The mobile trend has not yet caught up in India. Surprisingly most users still use their smart

phones for less than three hours. Nonetheless there was a scope for improvement with betterment in the utility value of these smart mobile phones. They needed to be made smarter for our Indian TG.

The study revealed that Indian target audience get attracted towards Gmail, Facebook, Whatsapp messenger more than the others. It could be inferred that dropping ads on these networks would never fail to gain impressions.

The target audience didn't seem to shy away completely from financial transactions. There are still a few people who trust the security of their own smart phones. The study also revealed that considerable amount of people download apps, maybe not to a great extent but in their little way they do.

When it came to App purchases to unlock the full potential of the app, it was found that 42% target audience seem to have no apprehension to doing so. The study revealed that 38% of audience paid for apps. This shows that people are willing to pay for a useful app.

With the Google Map revolution in its full throttle 72% of audiences preferred to use Google maps for their navigation purpose and found it very convenient to get to their desired destination.

During the study, 17% of the target audience said they access the social networking sites at least seven times in a day, which is a considerable number. Next to that are the addicts who use the internet to access the social networking sites at least ten times or more than that. They simply can't get enough of the social buzz and want to be constantly updated on what's trending.

Almost 56% target audience preferred to look up deals on their mobile phone before purchase, making us safely conclude that people find mobile an accessible and convenient tool to search for mobile deals available online. During the study it was found that 81% target audience notice advertisements (ads) thrown up on their mobile phone. From the previous inference if people would opt for deals they see on their mobile phone, this would make it an ideal niche marketer paradise.

When it comes to responding to the relevant advertisements on mobile, 22% target audience believe that if they see something relevant it would not stop them from responding to the advertisement. It was found that there was a general consensus on usage. Audiences mostly prefer to use their mobile phones for chatting, emailing, texting, and playing games. The audience opinions that they would like to use their mobile phone for anything that is useful, available and accessible. These points to the fact that the mobile is a very powerful device that has collated so many functionalities in it that over a period of time people would use their mobile for more than just chatting and texting.

## 6. Conclusion

Marketing no longer is restricted to a one-channel broadcast, but is a swirling mix of many kinds of media, on many devices, and many points of dialogue. Prospects are bombarded with a billion messages, images and sounds all day long. They interact with the world using a variety of devices from which they move back and forth all day—their phone, the TV, their phone again, maybe the newspaper, scrolling digital signs on their way to work, their laptop at the office, maybe a quick Facebook check-in on their phone again. Regardless of whether their phone is a smart phone with apps, that mobile device is the interface to which they return again and again.

The dialogue is no longer just from marketers. It is two-way, where marketers are part of a seamless community. And out of that mix, marketers and their messages have to be the one that pops out and grabs prospects and drives them to act. Marketers are aware that users are smarter and have more options for information. If your page doesn't load quickly enough they will exit the site and go to a competitor. The new technology is allowing websites to be developed for the mobile web that doesn't require download or installation of code—they just run. So they need a web infrastructure to support mobile access and speed. They need to create shareable content, and allow users to tailor their experience. They need to provide location-based information that's personal and relevant to users—including check-ins, rewards, promotions like the Foursquare which is gaining ground in India.

Best put by Bill Schick (an avid blogger), it is imperative for a business to adopt a mobile strategy since our lives are mobile. That's why all marketing plans need a mobile component, with a thoughtful eye toward technologies and approaches that make it easy and fast to implement. An integrated mobile marketing approach should be followed for advertising (through banner-ads, mobile videos, IVR-for voice ads, games and mobile casting), branding (Alerts, Surveys, Polling, Information, Branded content), Promotion (Jingles, Ringtones, Coupons, Contests, Free samples) and Direct Marketing (Mailers, Messages, Voice mails, Voice messages, SMS / MMS).

It is imperative to give customers an opt-in and not just push content to them. Along with an option it is a norm nowadays to give an opt-out as well. Marketers should segment customer base as accurately as possible giving value in the message delivered to them. And finally success of a campaign is defined on its timing. The biggest advantage of mobile marketing is that it gives personalization edge to the consumer.

For a successful mobile marketing campaign marketer should understand how their customer uses mobile technologies in their customer hourglass. They should think bigger than the marketing department – their customers desire a full experience. They should seek input from marketing, sales, support, and loyalty programs. Also they should use data types in combination for deadly advantage i.e. social profiles, with location data, with historical preference.

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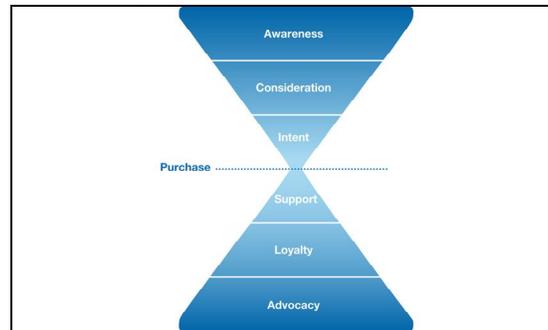


Figure 1: Customer Hourglass

**Relative Efficacy of Mobile vs. Other Advertising Media, 1/11**

	Reach	Targeting	Engagement	Viral	Transaction
Mobile	100	90	70	80	80
Internet	50	50	80	40	60
TV	90	30	90	10	20
Print	40	10	20	10	10
Radio	60	10	40	10	10
Outdoor	20	10	10	10	10

Source: Chetan Sharma, January 2011

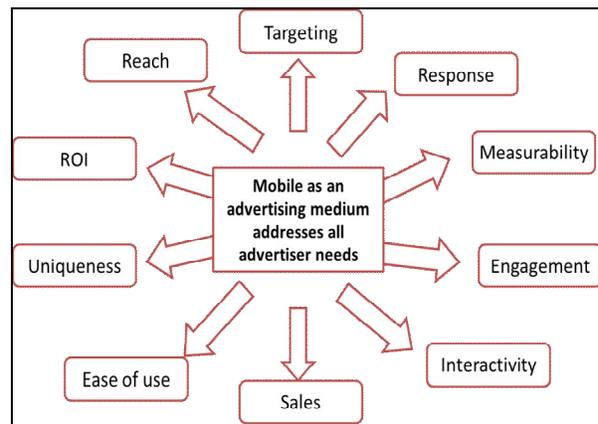


Figure 2: Relative Efficacy of Mobile Vs. Other Advertising Media  
&  
Figure 3: Reach Of Mobile as an Advertising Medium



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## Product Life Cycle: From the Eyes of Fuzziness

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### **Abstract:**

Any product after being introduced in the market goes through its growth maturity and decline phases. In which the sales of the product first increases, attains a constant or nearly constant value and then starts declining respectively with respect to time. This paper uses fuzzy logic in all of the above mentioned phases of the product. Fuzzy logic was introduced by Professor Lotfali Askar Zadeh (born February 4, 1921), better known as Lotfi A. Zadeh, is a mathematician, electrical engineer, computer scientist, and a professor of computer science in the University of California, Berkeley. In broader senses it can be said that fuzzy logic is the branch of mathematics which deals with the cases in between happenings and non happenings. In other words fuzzy logic is the branch of mathematics which tries to find the logical output of input data in between “0” and “1” and including “0” and “1” too. Using fuzzy logic, computers can be made to operate including ‘0’ and ‘1’ and in between them also. Using fuzzy logic the important decisions regarding the product as at what time the product is to be lifted off from the market or when more volume of the product should be introduced to the market e.t.c. can be taken and that too with proper mathematical justifications. Thus fuzzy logic can be utilized inseparably in the introduction, growth and decline phases of a product.

**Key words** Product life cycle, Decisions, Fuzzy logic  
JEL classification C6, E1

### **1. Introduction**

As per Sir Philip Kotler to say that a product has a life cycle is to assert four things

- Products have a limited cycle
- Products sales pass through distinct stages each posing different challenges, opportunities and problems to the seller.
- Profits rise and fall at different stages of product life cycle.
- Products require different marketing, financial, manufacturing, purchasing, and human resource strategies in each life cycle stage.

Most product life cycle curves are bell shaped. This curve is typically divided into four stages, introduction, growth, maturity and decline

- Introduction: - a period of slow sales growth as the product is introduced in the market profits are nonexistent because of the heavy expenses incurred with the product introduction.
- Growth: - A period of rapid market acceptance and substantial profit improvement.
- Maturity: - a period of slowdown in sales growth because the product has achieved acceptance by most potential buyer. Profits stabilize or decline because of increased competition.
- Decline: - the periods when sales show downward drift and profits erode.

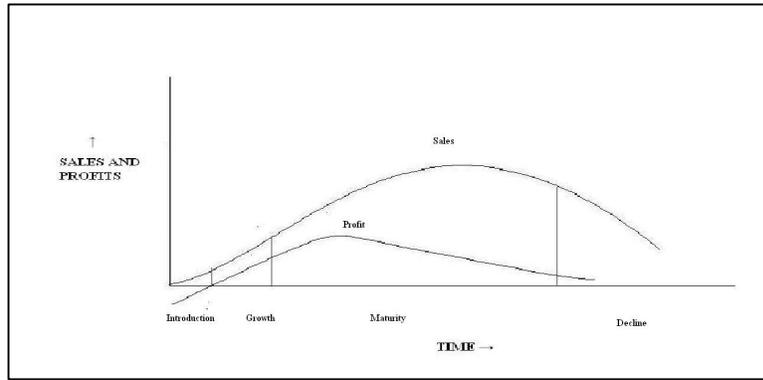


Figure 1

This paper deals with the most common form of product life cycle (PLC). Before describing fuzzy logic we need to understand fuzzy sets and before understanding about fuzzy sets we need to refresh a little set theory definition.

Sets To distinguish between fuzzy sets and classical (non fuzzy) sets, we refer to the latter as crisp sets. The letter X in this paper denotes the universe of discourse, or universal set. This set contains all the possible elements of concern in each particular context or application from which sets can be formed. The set that contains no members is called the empty set and is denoted by  $\Phi$ . To indicate that an individual object x is a member or element of a set A, we write  $x \in A$  whenever x is not an element of a set A we write x does not belong to A. There are three basic methods by which sets can be defined within a given universal set X.

- A set is defined by naming all its members (the list method). This method can be used  $\{a_1, a_2, a_3, \dots, a_n\}$
- A set is defined by a property satisfied by its members (the rule method. A common notation expressing this method is  $A = \{x|p(x)\}$  where the symbol “|” denotes the phrase “such that” and p(x) designates a proposition of the form “x has the property p”. That is, A is defined by this notation as the set of all elements of x for which proposition p(x) is true. It is required that the property p be such that for any given  $x \in X$ , the proposition p(x) is either true or false.
- A set is defined by a function usually called a characteristic function, that declares which elements of X are members of the set and which are not. Set A is defined by its characteristic function  $\mu_A$  as follows

$$\mu_A(x) = 1; \text{ for } x \in A$$

$$0; \text{ for } x \text{ does not belong to } A$$

The characteristic function maps elements of X to elements of the set  $\{0, 1\}$ , which is formally expressed by  $\mu_A: X \rightarrow \{0, 1\}$ . For each  $x \in X$  where  $\mu_A(x) = 1$ , x is declared to be a member of A; when  $\mu_A(x) = 0$ , x is declared as a nonmember of A.

As defined the characteristic function of a crisp set assigns a value of either 1 or 0 to each individual in the universal set, thereby discriminating between members and nonmembers of the crisp set under consideration. This function can be generalized such that the values assigned to the elements of the universal set fall within a specified range and indicate the membership grade of these elements in the set in question. Larger values denote higher degrees of set membership. Such a function is called membership function, and the set defined by it a fuzzy set.

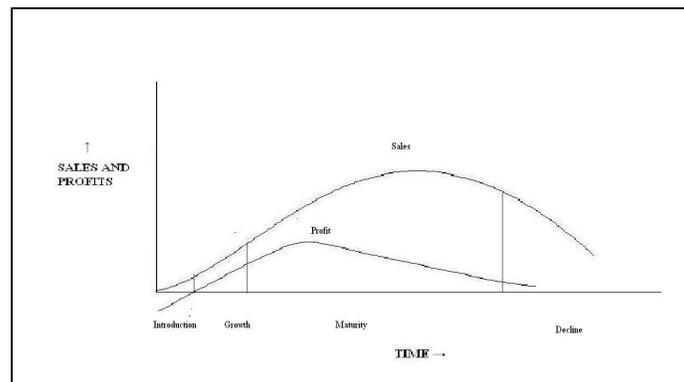


Figure 2

The most commonly used range of values of membership function is the unit interval  $[0, 1]$ . In this case each membership function maps elements of a given universal set X, which is always a crisp set, into real numbers in  $[0,1]$ . This can be depicted as  $\mu_A: X \rightarrow [0,1]$ .

## 2. Logic

Logic is the study of the methods and principles of reasoning in all its possible forms. Classical logic deals with propositions that are required to be either true or false. In logic and philosophy, the term proposition (from the word "proposal") refers to either (a) the "content" or "meaning" of a meaningful declarative sentence or (b) the pattern of symbols, marks, or sounds that make up a meaningful declarative sentence. The meaning of a proposition includes having the quality or property of being either true or false, and as such propositions are claimed to be truth bearers. Fuzzy logic is a form of many-valued logic derived from fuzzy set theory to deal with reasoning that is fluid or approximate rather than fixed and exact. The fundamental difference between classical propositions and fuzzy propositions is in the range of their truth values. While each classical proposition is required to be either true or false, the truth or falsity of fuzzy propositions is a matter of degree. Assuming that truth and falsity are expressed by a number in the unit interval  $[0, 1]$ . This paper uses one more thing known as linguistic hedge (or simply hedge).

## 3. Linguistic Hedge

Linguistic hedges are special linguistic terms by which other linguistic terms are modified. Linguistic terms such as very, more or less, fairly or extremely are examples of hedges. They can be used for modifying fuzzy predicates, fuzzy truth values and fuzzy probabilities. E.g. the proposition Y is old which is assumed to mean Y is old is true may be modified by the hedge "very" in the following three ways.

Y is very old is true

Y is old is very true

Y is very old is very true

Hedges are not applicable in crisp predicates, truth values or probabilities e.g. very horizontal or very rectangular are not meaningful. Any linguistic hedge may be interpreted as a unary operation  $h$ , on the unit interval  $[0, 1]$ . Since each element of a fuzzy set is associated with some membership grade ( $\mu$ ) with it thus this paper uses linguistic hedges to operate on their membership grades. Very is often interpreted as  $\mu^2$ , fairly is interpreted as  $\mu^{1/2}$  and so on.

## 4. Methodology

The below mentioned is a general product life cycle. When the product is declining let the maximum sales be 1 (irrespective of the actual value). This step is being done so that each sales value can be associated with a value a membership value in the range  $[0, 1]$ . The membership grade of any sales value can be calculated in terms of the maximum sales value by using the formula given below.

max sales=1 (assumption irrespective of the actual maximum sales value); max sales means maximum sales

$\mu(\text{sales}(t)) = \{1/(\text{max sales})\} * \text{sales}(t)$ ; where sales(t) is sales at time t

The membership grades can be assigned by using any other standard method too.

Now we can form a fuzzy set of sales as  $\{(\text{sales}(t_1), \mu(\text{sales}(t_1))), (\text{sales}(t_2), \mu(\text{sales}(t_2))), (\text{sales}(t_3), \mu(\text{sales}(t_3))) \dots (\text{sales}(t_n), \mu(\text{sales}(t_n)))\}$ .

Now if  $\mu(\text{sales}(t_2)) = [\mu(\text{sales}(t_1))]^2$

And  $\mu(\text{sales}(t_3)) = [\mu(\text{sales}(t_2))]^2$  and so on where  $t_1 < t_2 < t_3 \dots < t_n$

Or if  $\mu(\text{sales}(t_2)) = [\mu(\text{sales}(t_1))]^{1/2}$

And  $\mu(\text{sales}(t_3)) = [\mu(\text{sales}(t_2))]^{1/2}$  and so on where  $t_1 < t_2 < t_3 \dots < t_n$

Then the manufacturer can immediately say that the decline of product is very fast or fairly fast respectively. Hence the nature of decline rate is predicted mathematically. This method can be extended to a number of time periods. Hence the important decisions can be taken regarding the product. Similar discussions also holds for the growth phase of product but in this case since the product has not attained its maximum sales value yet so the maximum sales should be taken as the last known value of the sales in the growth phase in this case also  $t_1 < t_2 < t_3 \dots < t_n$ . Using the above stated methodology the nature of growth can also be predicated mathematically and hence the important decisions can be taken for the product as whether more volume should be introduced to the market or not. Some other important decisions regarding the product may also be taken by using these facts. This method can also be used (if needed) in the similar way for the maturity phase in order to get an idea of nature of maturity phase. A similar discussion holds for profit also.

## 5. Conclusion

This paper is using fuzzy logic to provide the mathematical foundation on which important decisions regarding the product can be taken in its growth phase as when to provide more volume in the market. On the other hand what is the nature of growth of the product whether it is growing fast, very fast, or fairly fast, can be seen. In the decline phase important decisions such as when to wind off the product from the market or should the product be continued in the market any more? can be taken. On the other hand the nature of the decline rate of the product i.e. is the product declining fast or is it declining very fast or it is declining fairly fast can be seen. Thus we believe if this paper is considered and taken into account by the manufacturers it will be a certain and before hand information regarding withdrawal or continuation of the product to create an alertness regarding the product

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## SAP Supply Chain Performance Evaluation of Dr. Reddy Labs

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### **Abstract:**

*Technological advancements and highly demanding customer needs intensified global competition which has brought a paradigm shift in the organization's approach in running a business. Since business environment is changing at a rapid pace, organizations started adapting to integrated enterprise-wide systems, enterprise resource planning (SAP) for competitive advantage. SAP's collection of cross functional integration of the business applications within the firm and across the network of the firm comprises the supply chain. However, supply chain management (SCM) is being recognized as the management of partner relationships across the supply chain. Most effective supply chain networks are dynamic in nature, distributed in architecture and leverage sophisticated real-time analytics.*

**Key words:** SAP, SCM, Dr. Reddy labs, Inventory, Profits

### **1. Introduction**

Markets have become highly transparent with more focus in meeting demands of the customer needs and requirements [4] and the rate of change of business at global scenario is highly dynamic [5]. The implementation of ERP packages has provided an opportunity for organizations to re-engineer business processes and enhance the decision-making process. The know-how of “putting it altogether” to provide an end-to-end functional system is an important obstacle that should not be underestimated, especially if one is considering integration with current large-scale enterprise resource planning (ERP) software systems like SAP [1], If the proper Coordination mechanisms are not in place across the various functions, the process will be neither effective nor efficient[8].

Many organizations have reported dramatic improvements from SAP R/3 implementation. New initiatives in resources planning, electronic commerce and extended supply chain drive the trend among corporations towards integrating strategic business applications. ERP systems assist enterprises in automating and integrating corporate cross-functions such as inventory control, procurement, distribution, finance and project management. Through information sharing, SCM enables supply-chain partners to work in close coordination to facilitate supplier-customer interactions and minimize transaction cost [2]. Short response times and availability of quick information, to enable individual stakeholders to plan, organize and control their supply chain activities.

### **2. Literature Study**

Inventory is one of the most common information shared between supply chain partners. According to [9] indicate, inventory and communication are economic substitutes. To implement echelon-based inventory control, the upstream company should monitor the inventory levels at the downstream of the supply chain and produce only if the inventory position is low, so that the upstream company can determine when and what to produce and downstream companies will improve the service level with minimum inventory [10]. [11] Studied extensively on currently running “Supply Chain Management” system for the logistic and manufacturing companies. The outcome of the research was currently running system needs to be integrated with other “Line of Business” systems like ERP to capture the changing aspects of organization, market and demand & supply. Developed a SAP R/3 based ERP architecture in an effort to create a value oriented supply chain that enabled a high level of integration and communication among all supply chain processes [15]. Further Integrating SAP web functionality with SCM is identified as a key to improving supply chain level processes [12]. A web based solution will provide all the involved parts with simultaneous access to all the Electronic Commerce information [13]. Many B2B and B2C ecommerce are using cloud for productivity gain and efficient supply chain management. Cloud computing allows companies to access IT-based services such as infrastructure, applications, platforms, and business processes via the Internet [14].

Supply Chain Management gave visibility across operational activities from demand forecasting, to the sourcing of raw materials, through to manufacture and dispatch and thus increased improved communication within internal and external business networks with enhanced industry clock speeds [6]

### 3. Objectives

- Understand the mySAP SCM system overview
- Performance Analysis of Dr. Reddy Labs using various ratios.

### 4. Methodology

Following formulae are used

- Inventory Turnover Ratio = Cost of Goods Sold / Average Inventory
- Gross Profit Ratio = (Gross Profit / Net Sales) \* 100
- Gross Profit = Net Sales – Cost of Goods Sold
- Operating Profit Ratio = (Operating Profit / Net Sales) \* 100
- Net Profit Ratio = (Net Profit after Tax / Net Sales) \* 100
- Return on Investment = Net Profit after Tax / Share Holders Funds
- Earnings per Share = Net Profit after Tax – Preference Dividends / Number of Equity Shares
- Working Capital Turnover Ratio = Cost of Goods Sold / Net working Capital
- Debt Equity Ratio = Outsiders Funds / Share Holders funds
- Where Operating profit = Gross Profit – Operating Expenses
- Operating Expenses = Office Expenses + Administrative Expenses + Selling Expenses + Distribution Expensed + Depreciation
- Share Holders Funds = Equity Share Capital + Preference Share Capital + Reserves and Surplus + Accumulated Profits + Fictitious Assets
- Net Working Capital = Current Assets – Current Liabilities
- Outsiders Funds = Long Term Loans

4 years of secondary data is used in study and is obtained from Annual reports

Scope of Study: is confined to Dr. Reddy Labs Pharma Company located in Hyderabad

### 5. Company Profile

Dr. Reddy's labs began as a high quality API manufacturer in 1984 and went international in 1991. Dr. Reddy labs value proposition to customers is derived from an optimal operating system in which operations, product development, inventory and marketing & sales are fully integrated though SAP. Operations and the supply chain are aligned to ensure high availability, pull based replenishment of products at the retail level and superior inventory turns to customers. It provides affordable and innovative medicines in all major therapeutic areas like gastro-intestinal, oncology, pain management, cardiovascular, dermatology, diabetes, etc. Recently they have focused into the rural markets in India to ensure the expansion.

Dr. Reddy labs, due to its efficient utilization of technology in SAP and SAP SCM, effective production processes, skill competencies and committed work force to high productivity became the third best Pharma company in India in national ranking 2012 according to MBASchool, Leonard Barton (1992) suggests that the tacit knowledge developed by skill engineers with an efficient production process over an extended period of time may become a source of advantage for the firm [5]. No wonder Dr. Reddy Labs belongs to this category of firms. Ranked as the best Company to work for in biotech and pharmaceutical industry in India and had bagged the award for 3 consecutive years

### 6. SAP

SAP has developed several generations of technologies that perform integration tasks of moving data between applications. SAP ERP is based on services based architecture, the SAP NetWeaver platform. This platform includes the tools that form the application's foundation and toolkits for new development and integration. The SAP Business Suite consists of SAP ERP and applications such as SAP CRM, SAP SCM, and SAP SRM. SAP's collection of business applications including SAP R/3 and the SAP Business Suite have been adopted by thousands of companies around the world. Some of those companies rely on SAP for every need and find substitutes only when SAP solutions fall short.

## 7. SCM

According to Mentzer, et al [7], "Supply chain Management (SCM) is defined as the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purpose of improving the long-term performance of the individual companies and the supply chain as a whole". Supply chain management (SCM) is the process of planning, implementing and controlling the operations of the supply chain with the purpose of satisfying customer requirements as efficiently as possible. SCM is the integration of key business processes from end-user through original suppliers that provides products, services, and information that add value for customers and other stakeholders (Global Supply Chain Forum).

Various activities are performed and coordinated within an organization, and every company should have supply chain relationships with other supporting organization, "Successful SCM requires cross-functional integration within the firm and across the network of firms that comprise the supply chain" [8]. Successful SCM requires integrating with key members of the supply chain for standardization of business processes which enables managers from different organizations in the supply chain to use a common language and link-up their organizations' processes effectively.

As global competition intensifies in response to tougher trading conditions, supply chain members from manufacturer to retailer are striving to attain process efficiencies that enable them to drive down costs and provide competitive advantage. [3] States that technologies have the potential to support the information flow and affect many of the dimensions of SCM such as cost, quality, delivery, flexibility and ultimately profits of the firm. They support the communication and coordination of the economic activities between separate units of an organization and collaboration along the supply chain by enabling better information processing, sharing [4] and faster responsiveness by making available online, real-time information networked around the organization and giving full supply chain visibility.

## 8.mySAP Supply Chain Management

SAP is the world's largest enterprise software company. The ability of SAP to deliver customer centric, open, personalized and collaborative inter-enterprise solutions on demand is the foundation of mySAP.com.

Applications for SCM include

- SAP Advanced Planner and Optimizer (SAP APO) that improves demand forecasting and increases production efficiency.
- SAP Logistics Execution System (SAP LES) that enables the efficient flow of goods along the supply chain with greater speed and accuracy.

mySAP SCM Planning solution offers a complete suite of tools for strategic to operational planning. It is part of the SAP APO and includes collaboration and integration functionality. The considerable flexibility of the mySAP SCM solution allows to setup company-specific business processes and planning rules. Following are the three main scenarios that represent the basic planning needs within the supply chain.

- Collaborative demand planning
- Collaborative supply and distribution planning
- Sales and operations planning

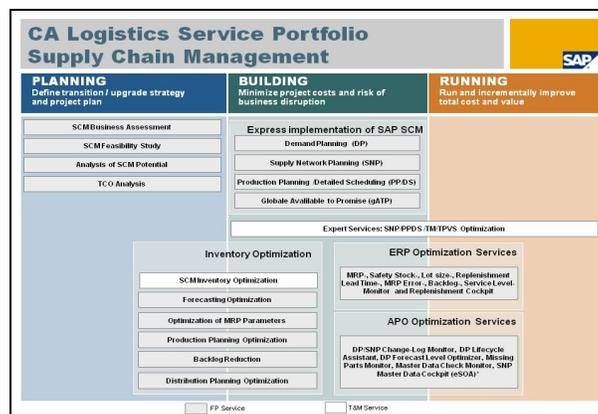


Figure 1: SCM, Source SAP AG

### 8.1. Collaborative Demand Planning (CDR)

CDR, Historical data is used to drive forecasting, promotion planning and demand planning. CDR uses information to create forecasts and carry out lifecycle planning through Statistical methods, Causal analysis using multiple linear regression, Composite forecasting Promotion planning is performed to include marketing activities, offering further collaboration possibilities with retailers or distributors.

8.2. Collaborative Supply and Distribution Planning (CSDP)

CSDP, partners within the supply chain can concurrently plan procurement, manufacturing and transportation, while integrating supply chain partners for collaboration. Supply Planning satisfy the demands and safety stock requirements in an optimal way, explodes the bills of material (BOMs), spreads production among resources, makes decisions about sourcing, creates allocations for customers and organizes the procurement of semi-finished goods or raw materials.

Based on the demand plan, Safety Stock Planning is carried out first. It enables to assign optimal safety stock and target stock levels to all inventories throughout the supply network. The system calculates safety stock calculations on lead times, forecast and supply variability and customer service levels.

- The Supply Planning heuristic calculates requirements for the sources of the products while taking quota arrangements, lead times, calendars and lot-sizing rules into account.
- The Supply Planning optimizer generates a feasible supply plan with minimal costs, considering all resources and constraints in the supply network. It uses linear optimization and multi-integer linear programming techniques based on simplex-based algorithms and branch and bound methods.
- Capable to Match matches a large set of prioritized customer demands (forecasts or orders) to a set of categorized supplies, taking into account the current production and transportation capabilities in a multistage production environment.

Distribution Planning consists of deployment, which considers the available products and satisfies the real demands based on flexible rules and the transport load builder, which fills transport vehicles in an optimal way. Deployment uses push and pull logic to recommend transports when the available-to-deploy quantity can adequately cover the demand. If demand exceeds supply, deployment uses fair-share logic to fulfill the open sales orders, safety stock, and forecast requirements in an optimal way.

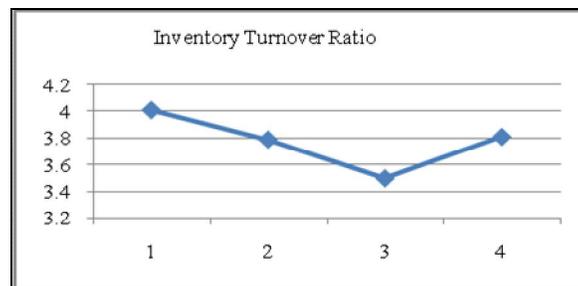
8.3. Sales and Operations Planning (S&OP)

The point of origin is the creation of a sales plan in SAP Strategic Enterprise Management (SAP SEM), part of mySAP Business Intelligence (mySAP BI). The sales plan allows creating marketing activities in the SAP Customer Relationship Management (SAP CRM). Marketing Planner will support the fulfillment of these plans. The results are transferred to SAP APO which will help collaborative demand and supply, and distribution planning.

9. Analysis And Interpretation

9.1. Inventory Turnover Ratio (ITR)

ITR is computed by dividing the cost of goods sold by the average inventory. An average inventory is determined by adding the beginning and ending inventories and dividing by two. The decline in the inventory turnover indicates the stocking of more goods. ITR measures the velocity of conversion of stock into sales. A high ITR indicates efficient management of inventory because more frequently the stocks are sold and the lesser amount of money is required to finance the inventory. A low ITR indicates an inefficient management of inventory.



Year	Year	Reddy Labs
2008 – 2009	1	4.01
2009 – 2010	2	3.79
2010 – 2011	3	3.5
2011 - 2012	4	3.81

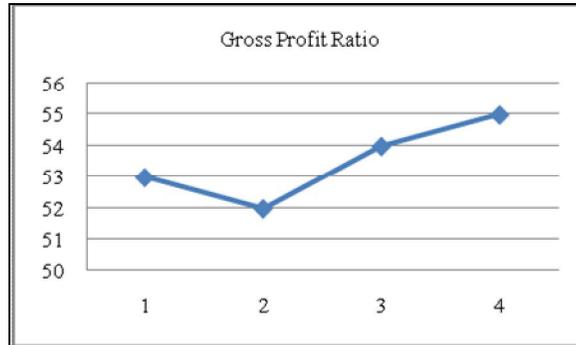
Table 1

From the table and the graph it can be observed that ITR in the year 2008-2009 is 4.01 and gradually decreased to 3.5 in 2010-2011 and then increased to 3.81 in 2011-2012

9.2. Gross Profit Ratio (GPR)

GPR measures the relationship of gross profit to net sales which is represented as a percentage. GPR is one of the very important ratios for measuring profitability of a firm. High GPR indicates better profitability position by increase in sales and less cost on operations of goods sold.

Gross Profit is excess of net sales over cost of goods sold



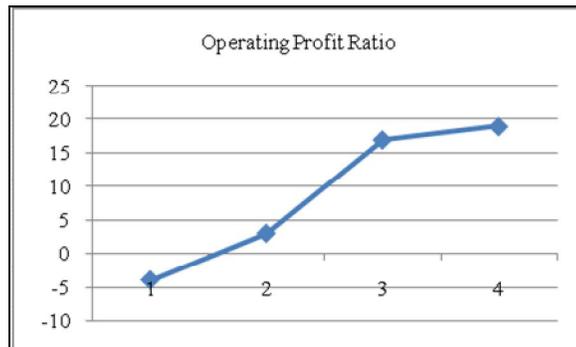
Year	Year	Reddy Labs
2008 – 2009	1	53
2009 – 2010	2	52
2010 – 2011	3	54
2011 - 2012	4	55

Table 2

From the table and the graph it can be observed that GPR for Reddy labs in the year 2008-2009 is 53% and decreased to 52% in the year 2009-2010 and then gradually increased to 55% in the year 2011-2012

9.3. Operating Profit Ratio (OPR)

OPR is calculated by dividing operating profit by net sales. Higher the OPR is said to be more favorable and indicates better operating efficiency.



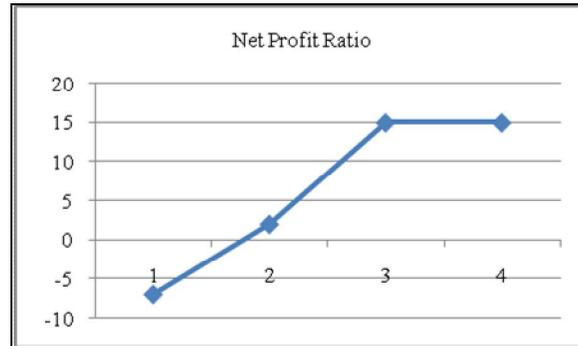
Year	Year	Reddy Labs
2008 – 2009	1	-4
2009 – 2010	2	3
2010 – 2011	3	17
2011 - 2012	4	19

Table 3

From the table and the graph it can be observed that OPR in the year 2008-2009 is (4) and gradually increased to 19 in the year 2011-2012. Since OPR gradually increased, Reddy Labs Operating Efficiency has improved and it is better.

9.4. Net Profit Ratio (NPR)

NPR establishes a relationship between net profit after taxes and sales which indicates the efficiency of the management in manufacturing, selling, administrative and other activities of the firm. This ratio is the overall measure of firm's profitability. Higher NPR indicates the better profitability of the firm.



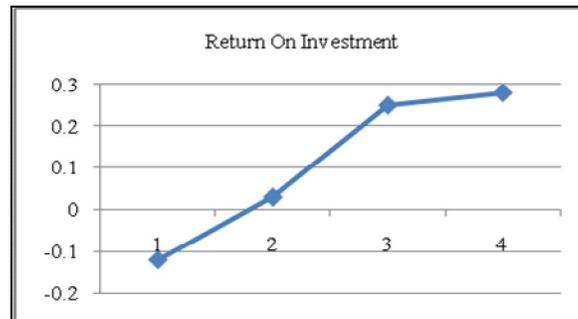
Year	Year	Reddy Labs
2008 – 2009	1	-7
2009 – 2010	2	2
2010 – 2011	3	15
2011 - 2012	4	15

Table 4

From the table and the graph it can be observed that NPR in the year 2008-2009 is (7) and gradually increased to 15 in 2010-2011 and 2011-2012. Since NPR gradually increased indicates better profitability of the firm.

9.5. Return On Investment (ROI)

ROI is a relationship between net profit after interest and tax and the proprietor funds. ROI is one of the most important ratios used for measuring the overall efficiency of a firm. Higher ROI indicates better results and focus on efficiency of profitability.



Year	Year	Reddy Labs
2008 – 2009	1	-0.12
2009 – 2010	2	0.03
2010 – 2011	3	0.25
2011 - 2012	4	0.28

Table 5

From the table and the graph it can be observed that ROI in the year 2008-2009 is (0.12) and gradually increased to 0.28 in the year 2011-2012. Since ROI gradually increased, it interprets efficiency of profitability of Reddy Labs increased.

9.6. Earning Per Share (EPS)

EPS is a small variation of return on equity capital. EPS is a good measure of profitability and when compared with EPS of similar other companies, it gives a view of the comparative earning power of a firm. Greater EPS indicates greater earnings power of the firm.



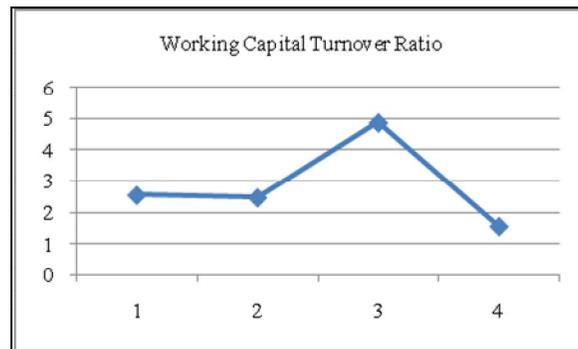
Year	Year	Reddy Labs
2008 – 2009	1	50
2009 – 2010	2	54
2010 – 2011	3	63
2011 - 2012	4	92

Table 6

From the table and the graph it can be observed that EPS for Reddy labs in the year 2008-2009 is 50 and gradually increased to 92 in the year 2011-2012. It can be said there is growth in EPS which indicate earning power of the firm is better.

9.7. Working Capital Turnover Ratio (WCTR)

WCTR indicates the velocity of the utilization of net working capital. It is directly related to cost of goods sold or sales. WCTR measures the efficiency with which the working capital is being used by a firm. A higher WCTR indicates efficient utilization of working capital but while interpreting a higher WCTR is not a good situation for any firm which means low WCTR is better to the firm.



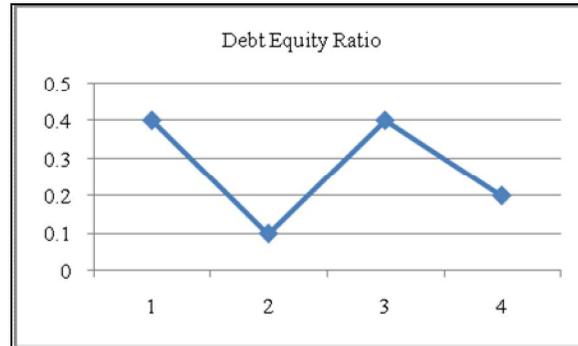
Year	Year	Reddy Labs
2008 – 2009	1	2.55
2009 – 2010	2	2.47
2010 – 2011	3	4.88
2011 - 2012	4	1.55

Table 7

From the table and the graph it can be observed that WCTR for Reddy labs in the year 2008-2009 is 2.55 and decreased to 2.47 in the year 2009-2010 and increased to 4.88 in the year 2010-2011 and decreased to 1.55 in the year 2011-2012. It can be said that utilization of working capital increased and decreased for every alternative year and finally for the year 2011-2012 low WCTR indicates better utilization of working capital.

9.8. Debt Equity Ratio (DER)

DER is also known as external – internal equity ratio. DER is calculated to measure the relative claims of outsiders and the share holders against the firm’s assets. DER indicates the relationship between the outsider’s funds and the share holder’s funds. A high DER indicates the claims of outsiders are greater than those of the owners which is unfavorable so low DER indicates better result.



Year	Year	Reddy Labs
2008 – 2009	1	0.4
2009 – 2010	2	0.1
2010 – 2011	3	0.4
2011 - 2012	4	0.2

Table 8

From the table and the graph it can be observed that DER for Reddy labs in the year 2008-2009 is 0.4 and decreased to 0.1 in the year 2009-2010 and increased to 0.4 in the year 2010-2011 and decreased to 0.2 in the year 2011-2012. It can be said that outside claims increased and decreased of the owner’s equity and finally for the year 2011-2012 low DER indicates favorable and is better for the firm.

10. Conclusion

mySAP SCM is used to manage the complex and changing flow of information, by performing timely collaborative supply chain planning, organization can achieve several benefits. Changes in market requirements can be absorbed by leveraging a partner network and adjusting business processes quickly and easily, affording more flexibility to planners. Supply chain partners gain insight into demand, inventory and capacity information across the extended supply chain network, delivering increased visibility. Optimal plans and operational schedules based on collaboration can be created. Supply chain activities can be synchronized internally and externally with plan and order driven, real-time execution of supply chain activities.

There is a overall growth rate of GPR, OPR, NPR, ROI and EPS of the firm from year to year which indicates sound overall profitability position. With increase in sales and decrease in ITR indicate generation of revenue and decrease in WCTR indicates better utilization of working capital. Decrease in DER indicates favorable condition of outsiders claim to owners equity and is better for the firm.

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## A Study of Efficient Quality Parameters in Supply Chain Management

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### **Abstract:**

*The aim of this paper is to highlight some prominent quality parameters which have influence on most of the supply chains related to different sectors or most of the organizations. The impact of quality parameters involved in various supply chain of different sectors has received less attention in literature. Although research on the quality parameters in supply chain management have been done in the last two decades still there is paucity of such research that put limelight on prominent quality parameters.*

**Key words:** Supply chain management, quality parameters, Literature review

### **1. Introduction**

As global market evolve and increase in world-wide competition along with the technological advancements, quality managers and supply chain managers are faced with many new challenges, as traditional approaches to managing quality and supply chains prove increasingly inefficient. This paper begins with a brief description of the main objective to be analyzed, followed by a review of the quality parameters in SCM. This is followed by an illustration of some of the prominent quality parameters. Finally, the paper concludes with a discussion and a brief statement on future research. Since the 20th century, quality has become a major influence in the business world. Although,

In general, for the major companies it all began with applying the theories of the quality gurus, especially doctors Deming and Juran. It is evident in the context of supply chain that quality has impact not only on supplier/distributor, employees, and customer but also it affects the overall business and growth of the organization. [1] Published a study describing the case of accompany from the textile sector, to help to

Understand how quality could be managed using an SCM perspective, and what the operative and strategic consequences were for the company understudy and the chain to which it belonged. They showed how SCM improves the capacity of the companies to recognize the expectations of the end customers [2].

In the current intense global competition, SCM principles and technologies are taking centre stage as a mean to achieve business excellence. This SCM movement embraces quality management initiatives, further supporting the notion that product quality is only one aspect of quality oriented continual improvement programs leading to competitive leadership. Highly publicized companies such as Wal-Mart and Dell Computer have integrated their supply chains to make efficient use of information and technologies while orchestrating all activities of the chain [3]. Today, customers want higher quality services at lower costs. In today's competitive environment, it is supply chains (SC) rather than companies that compete [4]. At the same time, the world is becoming a single industrial market. From the supply chain point of view, provision of high quality products at a cheap price helps to secure more customers and raise supply chain profits. Supply chain connections are critical to quality, on-time delivery, and cost reduction. The increasing emphasis on supply chain management is causing researchers to rethink models, concepts, and frameworks for quality management that have been developed for the field of operations management. Quality management practices reduce process variance, which has a direct impact on supply chain performance measures, including inventory and time measures, such as cycle time and delivery dependability. As process variances reduced; there is less need for safety stock and cycle stock inventory. Cycle times are shortened through the improved flows resulting from quality management practices, correspondingly less pipeline inventory is needed [5].

In order to elaborate the relationship of quality with SCM, let's take an example of retailer of shoes. Retailer keeps the store updated as per trend, have good quality shoes and have dedicated staff. He ships out a large stock of shoes for some faraway consumers. However the shoes are packed in a well organized manner. But on the way, the carrier lets the shoes to get damaged because of rough handling. The customer who buys our shoes sees a damaged box, and packing is also in very poor condition. Does the customer think our product is good? No. In the customer's mind there is a notion of terrible supply chain which cannot transport the shoes in good condition. The customer neither knows nor cares that it "is not retailers fault" – and if the product leaves the store as retailer would like it, but gets messed up along the way by another member of the supply chain – we are not delivering quality. Thus in order to explore such issues of quality in SCM, the objectives of the paper is framed as follows:

- To enumerate the quality parameters considered in the realm of SCM.
- To find out prominent parameters.
- To propose a framework of quality in supply chain.

## 2. Methodology

### 2.1 Selection of Articles

The articles were collected from four major management science publishers viz. Science Direct, Taylor & Francis, Emerald Online and Wiley Inter science (earlier Blackwell Synergy) as majority of well-referred journals of industrial management are found in these databases. Keywords like "supply chain management" and "quality parameters" were searched in all four databases. In total 110 articles were consulted.

### 2.2. Frequency Analysis of Quality Issues

In this paper various quality attributes is going to be discussed. Various quality parameters were noted and the number of papers in which they were present was considered as frequency. On the basis of the context in which parameters were present in the selected articles the parameters were identified as qualitative and quantitative.

### 2.3. Frequency Analysis Table

Quality Parameters	Quality Parameters	Qualitative/ Quantitative Or Both
Reliability (REL)	25	Both
Prompt delivery (PRD)	18	Qualitative
Communication (COM)	17	Qualitative
Trust (TR)	16	Qualitative
Responsiveness (RES)	14	Qualitative
Assurance (ASR)	9	Qualitative
Flexibility (FLX)	9	Qualitative
Commitment (COMT)	8	Qualitative
Consistency (CONS)	7	Both
Empathy (EMP)	6	Qualitative
Creditability (CRE)	6	Qualitative
Customer Satisfaction (CUS)	6	Qualitative
Access (ACC)	6	Qualitative
Courtesy (COU)	5	Qualitative

	<b>Quality Parameters</b>	<b>Qualitative/ Quantitative Or Both</b>
Order Accuracy (ORA)	5	Qualitative
Competence (CMP)	5	Both
Cooperation (COP)	5	Qualitative
Adaptation (ADP)	4	Qualitative
Confidentiality (CONF)	4	Both
Friendliness (FRND)	3	Qualitative
Completeness (COMP)	3	Qualitative
Customization (CUS)	3	Qualitative
Quick feedback /response (QF)	3	Qualitative
Collaboration (COL)	3	Qualitative
Price information with discount (PIWD)	3	Quantitative
Order tracking/ logistic status (OT)	2	Both
Punctuality (PUN)	2	Qualitative
After sales service/ assistance (ASS)	2	Qualitative
Coordination (CRD)	1	Qualitative
Politeness (POL)	1	Qualitative
Return policy (RP)	1	Both
Specificity (SPE)	1	Qualitative
Convenience (CONV)	1	Qualitative
Proactive (PRA)	1	Qualitative
Data accuracy (DA)	1	Qualitative
Delivery lead time (DLT)	1	Quantitative

Table 1

#### 2.4. Distribution Of Quality Parameters

These quality parameters are related to manufacturing sector, service sector and many other sectors. The success of organizations greatly depends upon the quality parameters (Reliability, Assurance, Tangibles, Empathy, Responsiveness, Access, Creditability, Commitment, Flexibility etc.) that are included in their supply chain. Some of qualities parameters (up to frequency 6) have more influenced on the supply chain than other quality parameters, as different sectors need different quality priorities to be employed in their supply chains. Various quality parameters has enlisted in this paper, their frequency in different sectors is noticed. Here in this

paper our aim is to find some of the prominent quality parameters which influence most of the supply chains related to different sectors or most of the organizations. From this study it can be seen that the most predominant quality parameters are

- Reliability(REL)
- Prompt delivery(PRD)
- Communication(COM)
- Trust(TR)
- Responsiveness(RES)
- Assurance(ASR)
- Flexibility(FLX)
- Commitment(COMT)
- Consistency(CONT)
- Empathy(EMP)
- Creditability(CRE)
- Customer satisfaction(CUS)
- Access(ACC)
- Courtesy(COU)
- Tangibles(TAN)
- Order Accuracy(ORA)
- Competence(CMP)
- Cooperation(COP)
- Adaptation(ADP)
- Confidentiality(CONF)
- Friendliness(FRND)
- Completeness(COMP)
- Customization(CUS)
- Quick feedback /response(QF)
- Collaboration(COL)
- Price information with discount(PIWD)

Quality parameters that are involved in supply chains of different sectors

Different Sector's	Quality Parameter's
MANUFACTURING SECTOR	REL, PRD, COM, TR, RES, ASR, COMT, CONS, EMP, CRE, CUS, ACC, COU, TAN, ORA, CMP, COP, COMP, CUS, QF, COL, PIWD, OT, PUN, ASS, CRD, RP, CONV, PRA, DA, DLT.
SERVICE SECTOR	REL, COM, TR, RES, ASR, COMT, CONS, EMP, CRE, CUS, ACC, COU, TAN, ORA, CMP, COMP, CUS, QF, PIWD, OT, ASS, POL, CONV, PRA, DA, DLT.
LOGISTICS	REL, PRD, COM, TR, RES, ASR, COMT, CONS, EMP, CRE, CUS, ACC, COU, TAN, ORA, CMP, COP, COMP, CUS, QF, COL, PIWD, OT, PUN, ASS, CRD, CONV, PRA, DA, DLT.

Table 2

### 3. Dominant Quality Parameters

Here every quality parameter has its own importance in different kind of supply chains. In this paper some of the prominent quality parameters that affect virtually all kind of supply chains that are applicable to different sectors are talked about.

#### 3.1. Reliability

Reliability has now become most significant performance measure for evaluation of quality of any supply chain. Reliability is nothing but a quality measuring tool. Reliability can be related to quality of service, delivery of product, delivery time, warranty issues and technology issue [6]. Reliability can be defined

as “number of full orders delivered to the due date and ability to perform the promised service dependably and accurately” [7] . The United States Advisory Group on reliability of electronic components gives the definition of reliability as referring to ‘products within the required timeframe and the conditions, to complete the trouble-free function of probability’ [8]. Reliability is defined as “the probability that an item (component, equipment or system) will operate without failure for a stated period of time under specific conditions “which predict success or failure of supply chain.

### 3.2. Prompt Delivery

Delivery should be on time and faster delivery always leads to lower costs[9]. According to Kannan, prompt delivery acts as “supplier selection criteria”[10]. Delivery speed plays an important role in selection of supply chain partners [11]. Raw materials and parts arrive within the delivery date [12]. Service should be on date and time. Prompt delivery of ordered goods to consumer destinations [13]. For prompt delivery emphasizes is on high quality delivery service [14].

### 3.3. Communication

Communication is ‘the formal as well as informal sharing of meaningful and timely information between firms’ [15]. Information sharing improves coordination between supply chain processes to enable the material flow and reduces inventory costs [16]. Communication is a very important aspect for reducing the gap between logistic service provider and focal firm [17]. Effective communication between trading partners is treated as one of the key assets for smooth functioning of any supply chain [17]. Lee suggests that when partners have successful information and knowledge sharing systems in place; they can exchange decision rights, work, and resources [18]. Finest suggest that timely communication and information sharing will decide the extent to which both Parties jointly engage in planning and goal setting Frequent and timely communication is also important because it assists in resolving disputes and aligning perceptions and expectations[19].

### 3.4. Trust

Trust is defined as a willingness to rely on a partner in whom one has confidence and regard [20]. Trust is related to Firm’s belief that another company will perform actions that will result in positive actions for the firm [21]. The trust between supply chain members will lead to long term relationships. The trust(Contractual trust, competence trust & goodwill trust) can be defined as “the firm’s belief that another company will perform actions that will result in positive actions for the firm, as well as not take unexpected actions that would result in negative outcomes for the firm” [21]. Higher trust in the supplier- firm relationship leads to reduction in inspection activities and in inventory costs [1]. The sixth factor ‘financial trust’(the aspect of maintaining financial trust between trading partners) comprises four items (timeliness, trustworthy, financial strength and minimum price charged).

### 3.5. Responsiveness

Responsiveness is willingness to help customer and provide prompt service [7], encompasses the ability and willingness of representatives to render services and tailor them as necessary [7]. Fast response to organizational work [22]. Responsive to customer's/ purchasers needs[23]. Reflects willingness to help suppliers and provide prompt service. Reliability in terms of "just-in-time delivery". Willingness of the purchasing department to help internal customers and provide prompt service. Responsiveness to customer needs.

### 3.6. Assurance

In today’s era quality assurance have become the fundamental requests of supply chain management. It helps in building quality based relationships between trading partners, Assurance of product quality, delivery by supplier [22]. Assurance is knowledge and courtesy of employee and their ability to convey trust and confidence to the customer [7]. Assurance leads to knowledge and courtesy of the purchasing department’s employees and their ability to convey trust and confidence [12]. Assurance reflects the ability to win trust and faith of their suppliers [24].

### 3.7. Flexibility

Flexibility is an ability to respond to unexpected demand change as per customer need in terms of volume and variety. According to Nilsson and Nordahl, in the face of shorter product life cycles, fast changes in market demands, and diversified consumer preferences, a flexible and quick response to environmental changes has become more and more important. The factor ‘service flexibility’ (the aspect of providing and accommodating right service as per the changes in requirements) directly relates to the aspect of meeting changes required in this dynamic environment. This factor depends on flexibility in respect of accommodating the changes as per requirements, terms and conditions of the supplier and IT use in its operations [22] also mentioned that, from a strategic perspective, a supplier’s flexible capability means to create an organizational structure with flexible managerial capabilities to facilitate emergency strategies. Flexibility involves that supplier accommodates changing needs of the focal organization. Fynes suggest that flexibility is related to volume flexibility and variety flexibility, Flexibility in raising production volumes.

A good supply partner should also be flexible in its dealings with its customers, e.g. flexibility in delivery schedule in order to meet better some urgent needs of customers [25].

### 3.8. Commitment

Commitment refers to the willingness of trading partners to exert effort on behalf of the relationship and suggests a future orientation in which firms attempt to build a relationship that can be sustained in the face of unanticipated problems. Commitment has been identified as the variable that discriminates between relationships that continue and that break down. Commitment refers to an enduring desire to maintain a valued relationship [20]. Commitment of trading partners leads to high level of information sharing and long term partnership success.

### 3.9. Consistency

In relevance to supply chain context Consistency is related to performance and delivery [22]. Consistency means producing a product or service as it is every time with same quality. Consistency in quality of product/services delivered [22]. When an organization consistently delivers superior value and wins customer loyalty, market share and revenues go up, and the cost of acquiring and serving customers goes down. Consistency means reliable reproducibility which will lead to control the processes.

### 3.10. Empathy

Empathy is all about caring, individualized attention the firm provides its customers [7]. It is evident that the empathy factor is not related to any one indicator. A possible indicator of the empathy level might be the "timeliness" on the communication of information about the disorganization (expressed in time units). In this way, the customer should be able to get 'measures' in short time.

### 3.11. Creditability

This factor is related to supplier reputation [22].The dimension is treated as the combination of reputation, honesty in operations, positive attitude and innovativeness in operation [22].Credibility is a determinant of quality that involves customers' appraisals of the trustworthiness and honesty of service providers. Credibility has a positive impact on supplier alliance success aspects such as satisfaction, price and quality.

### 3.12. Customer satisfaction

Customer satisfaction in terms that the product only contains what it claims to contain [26] .According to Michelson Clear and direct communication with the purchaser, swift order management and safe routes of transportation are here the fundament of customer satisfaction. Customer requires better product quality, faster delivery and cheaper costs, or quality-delivery-cost [9].Customer satisfaction could be achieved more effectively where quality was built into the whole supply chain [28].

### 3.13. Access

Access to suppliers, manufacturing organization and customers'etc [27]. Accessibility in terms of easy storage and retrieval of data. Service quality can be enhanced if customers are allowed to access their database hours and hence customer will be highly satisfied (e.g. In case of railway enquiry or order tracking information). Access refers to the extent to which customers perceive that the service provider is available when needed.

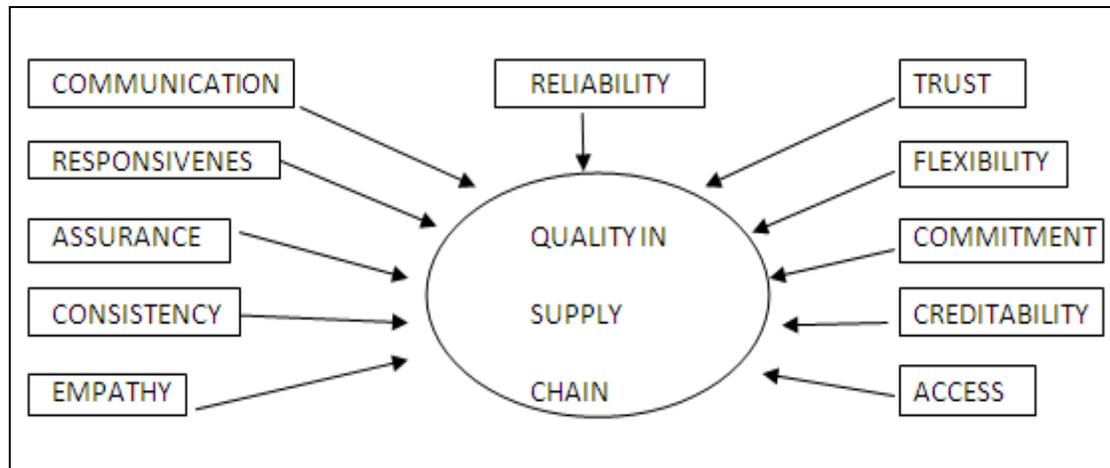


Figure 1: Showing Dominant Quality Parameters in Supply Chain

## 4. Discussion

The main purpose of this paper was to investigate about various quality parameters that can influence a supply chain. Here important aspects and different interpretations of dominant quality parameters are further discussed and reviewed. From the list of prominent parameters, it can be seen that we do not find presence of quantitative parameter (either it will be qualitative or it will be both qualitative and quantitative).This becomes an important reason for taking care of quality parameters at different stages of supply chain. It was also observed that presence of most of the dominant quality parameters(11 out of 13) like reliability, communication, trust, responsiveness, assurance, commitment, consistency, empathy, creditability, customer satisfaction, access can be felt in all the three sectors (manufacturing, service, and logistics). By looking at the frequency analysis table it can be said that quality parameters which occur more frequently should be given greater importance. In case, a compromise is to be made between reliability (frequency 25) and consistency (frequency 7) than we may go for a compromise in consistency rather than compromising for reliability. Supply chain management has become more and more important because supply chain management has a significant role in strengthening organizational competitiveness [18].And to strengthen Supply chain we necessitate employing quality parameters to achieve better

supply chain performance. This literature review provides guidelines for the organizations to understand the quality parameters which influence decisions in a supply chain management.

## 5. Conclusion

In summary, we can conclude that dimensions such as reliability, prompt delivery, communication, trust, responsiveness, adaptation, flexibility, commitment, consistency, empathy, creditability, customer satisfaction and access accompaniment and strengthen each other in terms of potentiated relationships that can last for many years.

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## Normative Influences on Consumer Impulse Buying Behavior

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### **Abstract:**

*Although consumer researchers have investigated impulse buying for nearly 50 years, almost no research has empirically examined its normative aspects. This article presents conceptual and empirical evidence that consumers' normative evaluations (i.e., judgments about the appropriateness of engaging in impulse buying behavior) moderate the relationship between the impulse buying trait and consumers' buying behaviors. Specifically, the relationship between the buying impulsiveness trait and related buying behaviors is significant only when consumers believe that acting on impulse is appropriate. The findings from two studies across student and retail customer samples converge and support the hypothesized moderating role of consumers' normative evaluations.*

**Key words:** Normative Aspects, Consumer Behavior, Impulse Buying

### **1. Introduction**

Impulsive behavior has a long history of being associated with immaturity, primitivism, foolishness, "defects of the will," lower intelligence, and even social deviance and criminality [1]. More recently, impulsive behavior has been characterized as specious thinking [2], which leads to myopic and in-consistent behavior [3]. In the consumption realm, impulsive behavior has been linked with "being bad," and with negative consequences in the areas of personal finance, post-purchase satisfaction, social reactions, and overall self-esteem [4]. Yet, it is possible to conceive of consumption situations in which impulse buying would be viewed as normatively neutral or even positively sanctioned behavior. For example, a spontaneous gift for an ill friend, a sudden decision to pick up the tab for a meal, or simply taking advantage of a two-for-one in-store special are impulse buying in-stances that may represent, respectively, kind, generous, and practical activities. When impulse buying is more virtuously motivated, it is likely to elicit more positive normative evaluations. This diversity of normative views, accompanied by the likelihood that they loom large around spontaneous spending, suggest that consumers' normative evaluations have the potential to influence their buying behavior. The probability that consumers actually engage in impulse buying presumably depends both on the degree to which they possess impulsive buying trait tendencies and on their normative judgments that may proscribe or permit a particular impulsive purchase. In theory, when a generally impulsive consumer experiences an impulse buying stimulus, and subsequently evaluates the prospective purchase as appropriate, both trait and normative influences are harmonious, thereby making an impulsive purchase likely. On the other hand, if negative normative evaluations arise in a purchase situation, the consumer's trait tendencies may be thwarted, and even a highly impulsive buyer will be less likely to act on his or her buying impulses. In order to examine the hypothesized relationship between the trait and normative aspects of impulse buying, we first review the theoretical bases for conceptualizing and operationalizing these variables. We then present two studies that evaluate the moderating role of normative evaluations in the relationship between the buying impulsiveness trait and subsequent buying behavior.

### **2. Literature Review**

#### *2.1. Conceptual Background*

### 2.1.1. Trait Aspects of Buying Impulsiveness

The general trait of impulsiveness, or impulsivity (the terms are used interchangeably), has been studied extensively by clinical and developmental psychologists, education researchers, and criminologists [5]. Presently, over a dozen psychological measures of general impulsiveness exist [6], yet there is no current theory-driven and validated measure of buying impulsiveness. This is despite evidence that a considerable number of consumers think of themselves as "impulse buyers": between 1975 and 1992, an average of 38 percent of the adults in an annual national survey responded affirmatively to the statement: "I am an impulse buyer" [7]. This finding, accompanied by psychologists' enduring treatment of impulsiveness as a basic human trait, encourages our belief that individuals' impulse buying tendencies can be conceptualized as a consumer trait that we label buying impulsiveness. We hypothesize that buying impulsiveness is a uni-dimensional construct that embodies consumers' tendencies both to think and to act in identifiable and distinctive ways. Specifically, we define buying impulsiveness as a consumer's tendency to buy spontaneously, unreflectively, immediately, and kinetically. Highly impulsive buyers are more likely to experience spontaneous buying stimuli; their shopping lists are more "open" and receptive to sudden, unexpected buying ideas. Also, their thinking is likely to be relatively unreflective, prompted by physical proximity to a de-sired product, dominated by emotional attraction to it, and absorbed by the promise of immediate gratification. As a result, impulsive buyers are more likely to act on whim and to respond affirmatively and immediately to their buying impulses. In extreme cases, impulsive behavior is almost entirely stimulus driven; a buying impulse translates directly into an immediate, yielding, and physical response, or as Levy [8] de-scribes it, a consumer "spasm." Moreover, impulsive buyers are likely to experience buying impulses more frequently and strongly than other consumers. To have an impulse, however, is not necessarily to act on it, as various factors may intervene between the impetus and the action. Even highly impulsive buyers do not give in to every spontaneous buying demand, as a variety of factors may alert consumers to the need for immediate deliberation and consequently "interrupt" the transition from impulsive feeling to impulsive action [9]. Factors such as a consumer's economic position, time pressure, social visibility, and perhaps even the buying impulse itself can trigger the need to evaluate a prospective impulsive purchase quickly [10]. We propose that one likely intervening factor arises from consumers' sub-jective, normative evaluations of acting on their buying impulses. Specifically, we hypothesize that normative influences operate as a moderator of consumers' im-pulse buying trait tendencies.

### 2.1.2. Normative Evaluations of Buying Impulsiveness

We define normative evaluations as consumers' judgments about the appropriateness of making an impulsive purchase in a particular buying situation. After selectively reviewing the relevant literature in clinical and developmental psychology, economics, criminology and consumer research, we sought to identify the normative dimensions that seem most likely to influence consumers' impulse buying behaviors. One central aspect derives from clinical psychologists' distinctions between rational and impulsive behavior. According to Freud and his later interpreters, two basic human thought processes, primary and secondary, differ in the degree to which they encourage impulsive behavior [11]. While secondary thought processes tend toward the rational and socialized, primary mental processes pull in the opposite direction and encourage uninhibited, impulsive behavior that is likely viewed as irrational. Some developmental psychologists elaborate on this thinking by associating impulsive with immature behavior. Because primary mental processes generate im-pulses that demand immediate gratification of basic, pre socialized needs (e.g., a toddler's candy tantrum), impulsive buying behavior among adults is likely to be evaluated as immature and self-centered. Much eco-nomic analysis agrees with this perspective, but emphasizes the fiscal improvidence of impulsive spending. Such views characterize impulsive purchases as behavioral choices that would not have been made had they been considered in terms of their long-term consequences rather than their immediate, gratifying benefits [3]. This perspective frequently leads to evaluations of impulse buying as shortsighted and wasteful. Finally, both the clinical and consumer literatures draw attention to linkages between impulsive acts and negative outcomes. When individuals act on impulse, they tend to do so quickly and non reflectively, which increases the likelihood of unintended and undesirable outcomes such as unwed adolescent pregnancy [12], drug and alcohol addiction [2], eating disorders[13], and criminal delinquency[5]. Impulse buying specifically has been linked to post purchase financial problems, product disappointment, guilt feelings, and social disapproval [4]. As this discussion suggests, there is an enduring and pervasive tendency to interpret impulsive behavior as irrational, immature, wasteful, and risky. To some ex-tent, negative views about impulsive behavior derive from interests in exceptional cases that involve significant departures from existing social behavior norms. However, the motives for and consequences of impulse buying for many individuals are less problematic. And much impulse buying arguably involves only minor in-fractions of relevant norms. In other hypothetical situations, normative influences might even encourage acting on impulse as the right thing to do.

### 2.1.3. The Moderating Role of Normative Evaluations

Normative perspectives on individual behavior pro-vide both general and specific social guidelines for acceptable conduct in particular situations [13]. This emphasis on the situational dimension is critical because even if consumers have generalized normative views about impulse buying, the most consequential influences are likely those that emerge when a consumer experiences a buying impulse in a particular situation. Moreover, different impulse buying situations tend to evoke varying normative evaluations. For example, impulse buying may be viewed as a socially acceptable way to spend 500/- in lottery winnings, but as a bad way to dispose of one's rent money. Even the most impulsive buyer probably will resist making an impulsive purchase that would cause him or her to be labeled as foolish, crazy, wasteful, or immature. Once normative forces become salient, how do they interact with consumers' impulse buying tendencies and behaviors? Much research on normative factors in consumer decision making relies on the perspective

taken by Fishbein's theory of reasoned action [14], in which subjective norms arise from individuals' predictions about how salient social referents will react to a considered behavior, coupled with individuals' motivation to comply with these normative expectations. However, the effect of subjective norms on behavior is viewed as mediated by individuals' behavioral intentions, which is incompatible with the spontaneity and immediacy of impulse buying transactions that transpire, by definition, without prior intention. As an alternative to the subjective norm component of the Fishbein model, we propose that the relationship between the buying impulsiveness trait and the act of buying something on impulse is moderated by consumers' normative evaluations of making an impulsive purchase. At first glance, it might seem that normative evaluations are incompatible with impulsive behavior. Yet there is typically some temporal delay between a buying impulse and an impulsive purchase, and the rapidity with which such transactions typically occur does not preclude the likelihood that consumers are still thinking, feeling, and evaluating various retail stimuli, if only for a few seconds. Even consumers who rank high in buying impulsiveness may experience normative encouragement or discouragement when the urge to buy something on impulse strikes.

### 3. Methodology

Specifically, when a consumer feels that impulse buying is acceptable in a particular context, a positive relationship should exist between the buying impulsiveness trait and subsequent behavior. Because normative constraints are absent, the consumer is free to act on his or her impulsive buying tendencies. Conversely, in situations where consumers believe it is un-acceptable to buy something on impulse, they will be constrained by norms that discourage or proscribe the contemplated behavior. These results in a blocking of the impulse; the consumers' trait tendencies are re-strained, which dilutes their impact on buying behavior. We examine this hypothesis in two studies.

#### 3.1. Study 1: Normative Moderators Of Buying Impulsiveness

This study investigates the relationship between buying impulsiveness and consumers' buying behaviors. Although we assume that consumers who rank high on this trait buy things on impulse more frequently than do others, we hypothesize a moderating effect in which consumers' impulsive buying tendencies are filtered by their normative evaluations about acting on impulse in particular situations.

##### 3.1.1. Method Sample and Data Collection

This study used a convenience sample of 212 undergraduate business students. Respondents were asked to select one of a set of purchase alternatives in a hypothetical buying scenario. We conducted this task before administering the items designed to measure buying impulsiveness in order to disguise our research agenda from respondents and to avoid response biases that might have arisen if we had reversed the procedures.

##### 3.1.2. Measurement of Buying Impulsiveness

Thirty-five items measuring buying impulsiveness were generated from a review of prior research of impulse buying phenomenology [4] and from extant literature on general measures of impulsiveness [5]. These items were pretested on a convenience sample of 281 undergraduate business students. Exploratory factor analysis, correlational tests, and confirmatory factor analysis were used to purify the measures across the pretest and study 1 sample. A confirmatory factor analysis on our final nine-item measure of buying impulsiveness suggests an acceptable model, with a chi-square statistic of 49.45 ( $df = 27$ ;  $p < .01$ ); an adjusted goodness of fit index (AGFI) of .92; a comparative fit index (CFI) of .97; and a normed fit index (NFI) of .94. All lambda coefficients are large and significant, and all t-values exceed 9.0 ( $p < .001$ ). The scale's mean = 25.1,  $SD = 7.4$ , and Cronbach's  $\alpha = .88$ .

The nine items that make up our buying impulsiveness scale are identified in Table 1, along with their factor loadings, means, and standard deviations.

##### 3.1.3. Measurement of Impulsive Purchase Decision

Our dependent variable relies on a single-item measure that forces respondents to choose what the consumer described in the following imaginary shopping situation would do: "Mary is a 21-year-old college student with a part-time job. It is two days before Mary gets her next paycheck and she has only 250/- left for necessities. In addition to food, Mary needs to buy a pair of warm socks for an outdoor party this weekend. After work, she goes with her friend Susan to the mall to purchase the socks. As they are walking through Bullock's, Mary sees a great looking sweater on sale for 750/-." After reading this scenario, respondents were instructed to select which one of five purchase decision alternatives Mary would make. These choice alternatives were designed to represent varying levels of buying impulsiveness. From low to high impulsiveness, these alternatives were: (1) buying the socks only, (2) wanting the sweater but not buying it, (3) deciding not to buy the socks, (4) buying both the socks and sweater with a credit card, and (5) buying these plus matching slacks and a shirt, also with a credit card. Our use of this imaginary stimulus situation assumes that respondents will protect themselves into the shopping scenario presented and that the impulsive buyers among the respondents will be more likely to elect an impulsive purchase choice. Also, an indirect questioning approach should reduce the likelihood that social desirability biases will encourage "correct" but dishonest responses [15] (Fisher 1993). To control for possible gender effects of the stimulus, half of the sample was exposed to an identical scenario that included a male imaginary character, Bob. An ANOVA was run on character gender as an independent variable. Because no significant gender effects were found, data from the two conditions were pooled.

### 3.1.4. Normative Evaluation

Hypothetically, this buying situation invites either negative or positive normative evaluations. Mary is low on cash and should be practical and frugal, but the upcoming party may encourage an impulsive splurge. Although impulse buying transpires quickly and without extensive deliberation, this does not preclude the possibility that consumers make on-the-spot evaluations of a prospective purchase. Our normative evaluation measure assumes that consumers may assess the appropriateness of buying something on impulse along a continuum that ranges from relative neutrality to either strong disapproval or encouragement. After the respondents indicated which purchase decision they believed that Mary would make, they were instructed to imagine that she actually bought the unplanned 750/- sweater and the planned socks. Respondents' normative evaluations of this relatively impulsive purchase decision were gathered from a semantic differential scale that operationalizes the normative dimensions we discussed earlier. The ensuing scale included these 10 bipolar adjective pairs: good-bad, rational-crazy, wasteful-productive, attractive-unattractive, smart-stupid, acceptable-unacceptable, generous-selfish, sober-silly, mature-childish, and right-wrong. The mean of the normative evaluation scale = 30.4, SD = 6.3, and Cronbach's  $\alpha = .91$ .

	Item	Factor Loading	Mean	SD
1.	I often buy things spontaneously.	.81	3.08	1.18
2.	"Just do it" describes the way I buy things.	.75	2.65	1.17
3.	I often buy things without thinking.	.76	2.33	1.19
4.	"I see it, I buy it" describes me.	.71	2.36	1.14
5.	"Buy now, think about it later" describes me.	.65	2.25	1.20
6.	Sometimes I feel like buying things on the spur-of-the-moment.	.64	3.40	1.04
7.	I buy things according to how I feel at the moment.	.63	3.17	1.19
8.	I carefully plan most of my purchases.	.62	2.81	1.16
9.	Sometimes I am a bit reckless about what I buy.	.60	2.99	1.08

Table 1: Buying Impulsiveness Scale: Study 1

### 3.1.5. Results

We hypothesize that consumers' normative evaluations moderate the degree or strength of relationship between the buying impulsiveness trait and impulse buying behavior. The appropriate test of differences in the trait-behavior relationship across different normative conditions is a comparison of product-moment correlations across normative subgroups [16]. Another reason for using subgroup analysis is our hypothesis that the effect of consumers' impulse buying norms as a trait-behavior moderator is not likely a continuous one. By nature, normative evaluations tend to be dichotomous, and their behavioral influence often communicates either a summary yes or no to some anticipated action. In the context of impulse buying, this idea suggests that normative influences operate as a behavioral "gate" that is either open or closed, with little or no middle ground. Thus, the relationship between consumers' impulse buying tendencies and their impulse buying behavior should be strong when normative evaluations are approving but weaker when some negative normative threshold is reached, which mutes consumers' trait tendencies. Given this hypothesis, it is appropriate to split the sample into subgroups [17]. We used a median split on respondents' normative evaluations of the impulsive sweater purchase to divide the sample into favorable ( $n = 110$ ) and unfavorable ( $n = 102$ ) subgroups. Respondents' own buying impulsiveness and the impulsiveness of their hypothetical purchase decision were significantly related in the favorable norm group ( $r = .33$ ,  $t = 3.47$ ,  $p < .01$ ). In other words, impulsive respondents who evaluated Mary's unplanned sweater purchase positively were also likely to have projected an impulsive purchase decision for her. In the unfavorable norm group, however, the trait-behavior relationship was not significant ( $r = -.002$ ,  $t = -.02$ ,  $p > .10$ ). When the sweater purchase was evaluated negatively, the respondents' buying impulsiveness had no effect on the purchase decisions they made for Mary. A Fisher's  $z$ -transformation revealed that the two correlations differed significantly ( $z = 2.45$ ,  $p < .01$ , one-tailed). These results support our hypothesis that consumers' normative evaluations moderate the link between the trait and behavioral aspects of impulse buying. To examine the robustness of the findings with a different basis for defining normative subgroups, the sample was divided into three groups and the within-group correlations were computed. A similar pattern of results occurred. The correlation between buying impulsiveness and the projective measure of impulse buying was significant only within the most favorable group ( $r(\text{favorable}) = .36$ ,  $t = 3.11$ ,  $p < .01$ ,  $n = 69$ ;  $r(\text{neutral}) = .10$ ,  $t = .82$ ,  $p > .10$ ,  $n = 69$ ;  $r(\text{unfavorable}) = .08$ ,  $t = .72$ ,  $p > .10$ ,  $n = 74$ ). This supports the idea that the effect of consumers' impulse buying norms as a trait-behavior moderator is not linear. Consumers' impulse buying tendencies may be most likely to express themselves in actual impulsive purchases only when some normative threshold is reached.

### 3.1.6. Discussion

The results in the favorable norm group support the view that consumers with positive normative evaluations are more likely to act in a way that is consistent with the degree to which they possess the buying impulsiveness trait. The lack of a significant association between the trait and behavior in the unfavorable norm group is also as hypothesized, but the reasons for this finding appear more complex. Individuals who have low impulsive tendencies and who also judge a possible impulse purchase negatively are unlikely to act on their buying impulses in such situations. However, when more impulsive consumers view a purchase as bad, they are likely to

feel varying degrees of ambivalence. These individuals feel almost simultaneously an arousing and spontaneous impetus to buy and a strong normative warning against acting on impulse. In some situations, individuals may feel deserving and frustrated, yet resist the urge to buy. In other instances, the buying impulse may "win out" when consumers ignore or rationalize exceptions to normative considerations. The very sense of violating prevalent norms may generate additional hedonic arousal and increase the likelihood of a purchase. Because of the possible variation in consumers' normative responses, the buying impulsiveness trait was less likely to predict (projective) behaviors when normative evaluations were unfavorable. The results of this phase of study 1 suggest that consumers' normative evaluations can moderate the link between the trait and behavioral aspects of impulse buying. The overall correlation between respondents' buying impulsiveness and their projected purchase decision for Bob or Mary was significant, but not particularly strong ( $r = .16$ ,  $t = 2.40$ ,  $p < .01$ ). However, this relationship is clarified by including normative components as trait-behavior moderators. Indeed, the association between buying impulsiveness and impulsive buying is considerably weaker when the anticipated behavior is perceived to be in appropriate and considerably stronger when a prospective purchase is evaluated positively. These findings provide some support for the moderating role of normative evaluations in the relationship between buying impulsiveness and impulse buying. Additional evidence about these dynamics will be offered from a second study that draws on a nonstudent sample gathered in an actual retail setting.

### *3.2. Study 2: Trait-Behavior Relationships in a Retail Setting*

This study was undertaken for three purposes. First, we sought to examine the relationship between buying impulsiveness and impulse buying among a more diverse sample of nonstudent respondents. Second, we sought to do so in situ with actual retail customers in a shopping environment. This not only provides a more naturalistic setting, but also allows us to examine impulsive buying behaviors soon after they occur. Third, we wanted to study actual shopping behaviors as a way of corroborating the results obtained with our projective purchase method. By varying the sample, setting, and method, we hoped to gain additional insight into the trait and normative aspects of impulse buying.

#### 3.2.1. Method

##### 3.2.1.1. Sample and Data Collection

A field study was conducted at a record store located in a mall in Ghaziabad (U.P.). As patrons over the age of 14 exited the store, they were asked to participate in a compact disc (CD) shopping study. Shoppers were recruited whether or not they had purchased anything, which reduced the likelihood that non impulsive buyers would be excluded from the sample. The respondents were asked to complete a six-page "consumer buying survey," which took approximately 10 minutes. A total of 104 respondents were surveyed during a single business day, between 11:00 A.M. and 6:30 P.M. The response rate was 48 percent, and refusals tended to be highest among single males over the age of 25. Five surveys were not included in the analysis because of missing data. Sixty-nine percent of respondents were 21 or younger, and the sample was evenly divided between males (49 percent) and females (51 percent). Fifty-three percent of respondents purchased one or more CDs while shopping in the store. Five key measures were gathered; the first three, described below, replicate the consumer trait, purchase decision, and normative evaluation measures we used in study 1. Two additional measures were collected for this study in order to examine the same variables in our retail field setting.

##### 3.2.1.2. Measurement of Buying Impulsiveness

Buying impulsiveness was measured with the nine-item scale that was developed in study 1. Although the student respondents from study 1 scored somewhat higher on the buying impulsiveness scale than did the participants from this study, a comparison of scale means ( $X_{study1} = 25.1$ ,  $X_{study2} = 21.5$ ), ranges (range study 1 = 9-43; range study 2 = 10-43;  $SD_{study1} = 7.4$ ;  $SD_{study2} = 7.1$ ), and coefficient alphas ( $\alpha_{study1} = .88$ ;  $\alpha_{study2} = .82$ ), revealed largely similar results across samples. Also, a confirmatory factor analysis of the scale produced an acceptable chi-square statistic of 44.88 ( $df = 27$ ,  $p = .02$ ), an AGFI of .86, a CFI of .93, and an NFI of .84. As in study 1, the results support a unidimensional conception of buying impulsiveness.

##### 3.2.1.3. Measurement of Impulsive Purchase Decision

The measure of the impulsiveness of the purchase decision was taken through a replication of the projective purchase decision from study 1. As before, the respondents were asked to indicate the choice that a hypothetical consumer (Mary) would make among five purchase alternatives that represent varying levels of impulsive buying.

##### 3.2.1.4. Measurement of Normative Evaluation (Sweater Purchase)

The measure of normative evaluation for the sweater purchase also replicates procedures that were used in study 1, wherein the respondents were asked to imagine that Mary actually bought the planned socks and the unplanned sweater. Then they were asked to evaluate this purchase decision with the same semantic differential scale we employed in study 1. Two adjective-pair items from the original 10-item scale (attractive-unattractive, rational-crazy) exhibited item-to-total correlations below .20 and were removed from subsequent analyses. The mean of this eight-item scale = 28A1,  $SD = 7.4$ , and  $\alpha = .90$ .

### 3.2.1.5. Measurement Of Normative Evaluation (CD Purchase)

In addition to replicating the projective choice task in study 1, we sought to examine the role of norms as a trait-behavior moderator in the context of shoppers' own consumer behavior. Because our sample was composed entirely of record store customers, we wanted to obtain a measure of normative evaluations about buying records on impulse. The respondents were asked to consider the following situation: "You came here planning to buy one specific tape or CD, and you ended up buying four." Then they were asked to indicate how this would make them feel, using the same set of scale items that we employed to measure normative evaluations in our earlier projective choice task. The mean of the resulting 10-item scale = 28.7, SD = 7.1, and  $\alpha = .81$ .

### 3.2.1.6. Measurement of Impulsive Record Buying

Consumers' actual in-store impulse buying was assessed with multiple measures that represent a continuum ranging from perfectly planned to impulsive buying. Based on a pretest of consumers buying musical recordings, three dimensions of purchase planning were identified and incorporated into the study: planning to buy within a general musical category (e.g., rock, country, classical), planning to purchase something by a particular artist or group (e.g., Bob Dylan, En Vogue), and planning to buy a specific musical recording (e.g., Van Morrison's Astral Weeks). Our premise is that the most impulsive purchases are those that are unplanned along all three dimensions. Respondents were asked to characterize each of their purchases on all three planning dimensions, using a zero-to-four scale (0 = completely planned; 4 = completely unplanned). Operationally, if no purchases were made, or if a purchase was completely planned on all three dimensions, the purchase was scored as zero on impulsiveness. If a purchase was unplanned on all three dimensions, the purchase was scored as 12. Within the sample, the degree of planning for up to three CDs was recorded, and an average impulse buying score was computed for each respondent. The mean for the three-item scale = 1.8, SD = 3.3, and  $\alpha = .93$ . The correlations among study variables are summarized in Table 2.

	Projective purchase replication			In-store study	
	Buying Impulsiveness (Trait)	Normative Evaluation (Norm1)	Impulse Buying (Buy1)	Normative Evaluation (Norm2)	Impulse Buying (Buy2)
Trait	1.00				
Norm1	.21	1.00			
Buy1	.53	.40	1.00		
Norm2	.10	.26	-.05	1.00	
Buy2	.21	.28	.20	.14	1.00

Table 2: Correlation Matrix: Study 2

### 3.2.2. Results

**Projective Buying Behavior.** As in study 1, we tested our hypothesis regarding the moderating role of normative evaluations with subgroup analysis. By a median split, the sample was divided into groups holding favorable ( $n = 43$ ) and unfavorable ( $n = 56$ ) normative views about the hypothetical sweater purchase, and two sets of correlation coefficients were calculated. As in study 1, the correlation between buying impulsiveness and impulsive purchase behavior is stronger in the favorable ( $r = .64$ ,  $t = 5.87$ ,  $p < .001$ ) than in the unfavorable ( $r = .33$ ,  $t = 2.43$ ,  $p < .01$ ) normative group. The difference between groups is significant ( $z = 2.03$ ,  $p < .05$ ). Thus, findings from a sample of retail shoppers support the belief that situational norms moderate the extent to which consumers act on their buying impulses. Further, as before, the sample was divided into thirds to examine the robustness of the results. The correlation between buying impulsiveness and impulsive purchase behavior decreases systematically as situational norms become less favorable ( $r(\text{favorable}) = .71$ ,  $t = 5.55$ ,  $p < .001$ ,  $n = 34$ ;  $r(\text{neutral}) = .46$ ,  $t = 2.88$ ,  $p < .01$ ,  $n = 33$ ;  $r(\text{unfavorable}) = .27$ ,  $t = 1.56$ ,  $p > .05$ ,  $n = 33$ ), which replicates the pattern discovered in study 1. **Record Buying Behavior.** As in previous analyses, the relationship between buying impulsiveness and impulsive purchase behavior was calculated for each normative subgroup, based on a median split. As predicted, significant differences were found between the two normative subgroups ( $z = 1.74$ ,  $p < .05$ ). Again, the relationship between respondents' buying impulsiveness and the impulsiveness of their actual purchase behavior was significant in the favorable norm group ( $r = .36$ ,  $t = 2.60$ ,  $p < .01$ ,  $n = 52$ ), but not in the unfavorable norm group ( $r = -.02$ ,  $t = -.15$ ,  $p > .10$ ,  $n = 48$ ). Moreover, we again divided the sample into thirds and calculated correlation coefficients for each subgroup. A significant relationship emerged only in the most favorable norm group ( $r(\text{favorable}) = .58$ ,  $t = 3.92$ ,  $p < .001$ ,  $n = 33$ ;  $r(\text{neutral}) = .03$ ,  $t = .19$ ,  $p > .10$ ,  $n = 33$ ;  $r(\text{unfavorable}) = .07$ ,  $t = .42$ ,  $p > .10$ ,  $n = 35$ ). In accordance with our findings in study 1, impulsive buyers are more likely to buy on impulse when they evaluate a particular behavior as normatively appropriate. However, when norms proscribe an impulsive purchase, the impact of the trait on buying behavior is muted. These findings provide further evidence that the relationship between buying impulsiveness and impulse buying is moderated by consumers' normative evaluations of the behavior.

### 3.2.3. Discussion

Impulse buying behavior represents a long-standing puzzle for consumer and marketing researchers, and many efforts to conceptualize and measure it have been thwarted [18] (Kollat and Willett 1969; Rook 1987). The results from the two studies reported here provide some insights into the social psychology that underlies the trait and behavioral aspects of impulsive buying behavior. Although, as expected, we observed a general tendency for impulsive buyers to make more impulsive purchases, we found that normative

evaluations moderate the relationship between this trait and subsequent buying behavior. Overall, our findings converge across student and in-store samples, classroom and retail settings, and both projected and actual shopping behaviors. By including consumers' normative evaluations in the equation, we were able to gain clearer insights about the conditions under which the trait of buying impulsiveness would translate into actual impulsive buying behavior. We also gathered evidence about the possible threshold nature of normative effects. Even impulsive buyers seem able to reject making an impulsive purchase when negative normative evaluations reach some critical level. However, more research is needed to fully understand how, when, and to what extent normative evaluations actually occur. For example, we have assumed that the most salient normative evaluations occur at the point of purchase, yet the present studies did not examine this. Although we discovered that consumers variously evaluated different impulse buying situations when asked to do so, we do not know how often such behavior occurs naturally. While we believe our findings support the idea that normative influences moderate the effects of consumers' impulsive trait tendencies, we need a better understanding of various contextual factors that are also likely to contribute to this relationship. Thus, future research might examine more broadly the social ecology in which these constructs interact. One interesting issue is how the social visibility of a prospective impulse purchase affects consumers' buying behavior (16). In theory, consumers will be less inclined to engage in impulse buying that is socially visible, either at the point of purchase or afterward. Analogously, impulsive purchases should materialize in contexts that provide relative social anonymity, such as in telemarketing, internet, and direct mail ordering. The effects of social visibility are also likely to vary according to the social composition of a particular shopping trip. When a consumer is shopping alone, he or she may feel less socially visible, which should lower one's inhibitions about acting on impulse. The effects of shopping with others are probably more diverse and dependent on others' assigned or enacted social roles. Within consumers' social networks, other sources of influence include the social control mechanisms that translate general impulse buying norms into more specific rules that define which product categories are permissible, who may participate, how much can be spent, and what sanctions arise when rules are violated. A related concern centers around what types of situations allow consumers to bend or break their impulse buying rules. Although we found that negative normative evaluations suppress consumers' impulse buying tendencies, social norms are not perfect filters between impulsive proclivities and impulse buying. Hypothetically, a consumer who is struck by a buying impulse may react to it as a terrible idea, as something he or she should not do, yet still go ahead and make the purchase. Who has not heard someone characterize a shopping episode with the confession: "I was bad today?" Sometimes consumers want to be bad. On the other hand, as we discussed earlier, impulse buying is not always normatively proscribed, as various situations may encourage it as practical, mature, appropriate, or merely as innocuous wickedness. Some arenas emphatically promote spontaneous consumption behaviors for example, amusement parks, vacation venues, sales events, gaming casinos, craft fairs and swap meets. In these settings, consumers are invited and encouraged to act on their impulses and, accordingly, their impulsive trait tendencies are likely to be good predictors of their buying behavior. These situations, however, tend to be exceptional circumstances. On an everyday basis, consumers are more likely to experience and evaluate buying impulses in the grocery store or the local mall. By definition, even everyday impulses are "some-times irresistible" [19], and many marketplace structures both increase the level of temptation and remove resistance barriers—for example, the availability of credit, automatic teller machines, telemarketing, 24-hour retailing, and price and money-back guarantees. Yet, consumers presumably do resist many buying impulses, and yield to others. In addition to obvious economic factors that affect consumers' responses to their buying impulses, trait and normative elements are also involved. This interplay of consuming impulses, consumers' impulsive trait tendencies, and the normative influences that moderate their expression constitutes a complex and intriguing behavioral landscape that merits continued study.

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## Design & Simulation of Graphical User Interface For SODAR System Using VC++

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### **Abstract:**

Acoustic remote sensing is the Science and engineering of obtaining the spectral, spatial and temporal information about the state of the first few hundred meters of the atmosphere above ground without coming into physical contact with it. The development of the acoustic methods for atmosphere research essentially relies on achievement in theoretical and experimental investigation in sound propagation in the atmosphere. The principle of acoustic remote sensing of the atmosphere involves the Bragg scattering sound, Gilman was the first person to use the term SODAR from the acronym: Sound Detection And Ranging, has been used as a means to study the structure of the lower atmosphere. In this paper, an audible 'beep' is beamed up into the atmosphere and very faint echoes from features within the air itself are detected back at the ground. Microsoft VC++ is a powerful object – oriented application integrated development environment. This object – oriented program are rich in structure, methods and attributes. The object – oriented frame work provides an important enabling technology for reusing software components. In VC ++, these frameworks are supported by Microsoft Foundation Classes (MFC). The MFC is used to develop the necessary visualization tools as it simplifies in writing the programs and it also provides many High level features that can save considerable coding effort. In this paper, designed a powerful GUI function facilitate the time – height plots in such a way that the plot can be stored, retrieved and processed to eliminate unwanted fixed echo signal, which are of non-atmospheric origin for sodar system. This paper is divided into four different layers such as user layer, application layer, operating system layer, and Hardware / Physical layer. The user layer gives the input to the application layer by mouse click or inputs through GUI icons. The application layer performs the signal processing such as parameter determination and further communicates with the operating system layer. The operating system layer acts as a bridge between hardware layer and application layer. Finally the Hardware / Physical layer takes care of commands executions, which are given by operating system layer.

### **1. Introduction**

Microsoft VC++ is a powerful object – oriented application integrated development environment. Object – oriented programs are rich in structure: Methods and attributes belong to classes, objects are instances of classes, and interclass relationship entails, association, aggregation, inheritance, and call relationships. The object – oriented frameworks provide a important enabling technology for reusing software components. In VC++, these frameworks are supported by Microsoft Foundation Classes (MFC). The MFC is used to develop the necessary visualization tools as t simplifies in writing the programs, and it also provides many high-level features that can save considerable coding effort. Programs written under windows are generally event-driven, which means that every procedure is triggered as result of some event. Result of this mechanism, the program can update and redraw various controls simultaneously via the view class in the program, to achieve visualization capabilities. The CDC, one of the objects of MFC, provides member function for working with a device context, such as drawing tools, type-safe graphic device interface (GDI) object selection, working with colors and pallets. It also provides member function for getting and setting drawing attributes, mapping working with viewport, window extent, converting coordinates, working with region, clipping, drawing simple shapes. The powerful GUI function facilitate the time-height plots in such a way that the plot can be stored, retrieved and processed to eliminate unwanted fixed echo-signals, which are of non-atmospheric origin for the SODAR system. In order to present the data on the client area of a window, the GUI is critical in visual C++ programming language. The present system is divided into layer, and Hardware / physical layer. Figure 1 shows the block diagram of the layer structure of system-based applications. Each layer takes care of the commands received from respective layers. The user layer gives the input to the application layer by mouse click or inputs through GUI icons. The application layer performs the signal processing such as parameter determination and further communicates with the operating system layer. The

operating system layer acts as a bridge between hardware layer and application layer. Finally the hardware / physical layer takes care of commands executions, which are given by operating system layer.

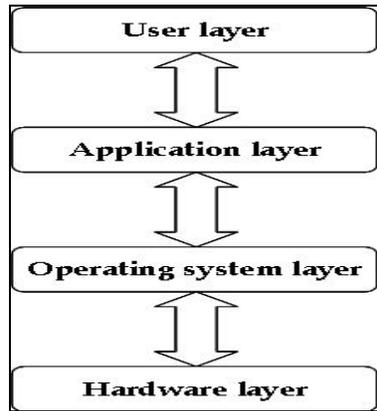


Figure 1: Block Diagram of Layer Structure for the PC-Based Application

One of the important features of the Microsoft VC++ and MFC is the document view architecture. This architecture is versatile in programming the application and also offers distinct interfacing schemes such as single document interface (SDI) with a single view, SDI with multiple views, Multiple Document Interface (MDI) with multiple views. Among the three schemes, SDI with multiple views scheme is chosen for the present experiment. SDI is a document-centric application that works with one document at a time and only one type of document.

**2. Design Features**

There are five parameters that need to be determined from the Doppler sodar echo-signal: display of echo-signal in the time domain, display of echo-signal FFT spectrum, display of time-height intensity plot in the form of the traditional facsimile record, display of vertical wind as a time-height plot, and display of horizontal wind as a time-height plot. Each parameter is displayed in a different client area in the designated five windows. The structural block diagram of the sodar echo-signal processing tool is presented in Figure 2. The processing of the Doppler sodar echo-signal starts with the digitization on the sound card.

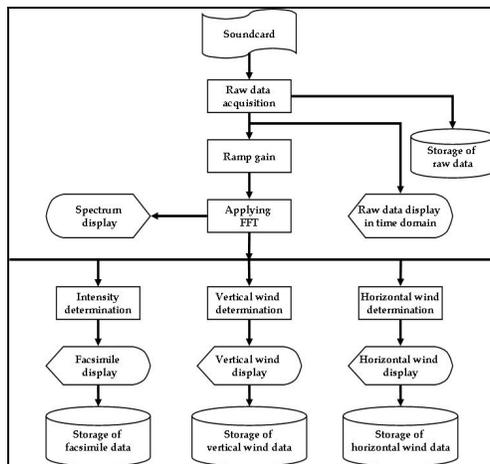


Figure 2: The Structural Block of Sodar Software

The raw data is stored in a secondary memory using an exclusive worker thread of the program. The digital data of the each range gate is copied into a buffer and applied to the processing routines in a separate worker thread of the program. Threading is one of the important features of the Microsoft VC++ and it support multithreaded real-time application. A thread is a path of execution within process. The primary thread is supported to OS by the startup code in the form of function address. One can create these additional threads depending on the application demand, and all threads in MFC application are represented by CW in thread objects. The MFC distinguishes two types of threads: user interface threads and worker threads are commonly used to complete tasks, such as recalculation that do not require user input. The GUI for the present experiment is designed in a such a way that it consists of five switch-selectable data screens: data in time domain mode, data in frequency domain mode, intensity (facsimile) record, vertical wind, and horizontal wind display. The primary window of the GUI of the present Doppler sodar system in shown in Figure 3.

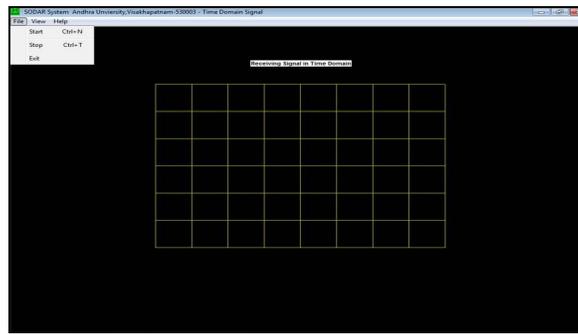


Figure 3: Primer Application Window of the Sodar System

When the user / operator clicks the button 'File' it shows a drop box which is shown in below Figure 4. The drop box shows three menu items, namely, Start, Stop, and Exit. By clicking the button 'Start', the system automatically takes the predefined sodar parameters and begins its operation. On its first window, by default, shows both transmitting and receiving signals in time domain mode. At any given time, if the user/ operator wants to switch over to observe the other windows or parameters, the tool provides another menu which is shown in the menu which is shown in the figure 5.

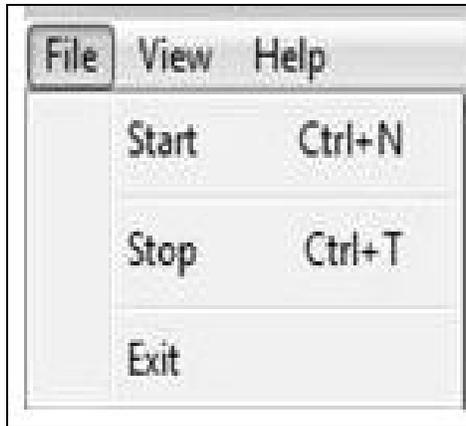


Figure 4: Pop-Up/ Drop Box of the Application of the Sodar

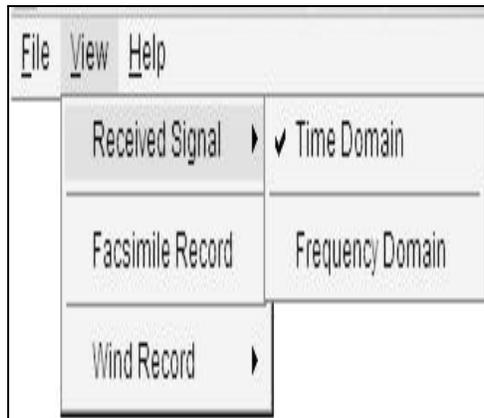


Figure 5: Pop-Up/ Drop Box of the Application of the Sodar

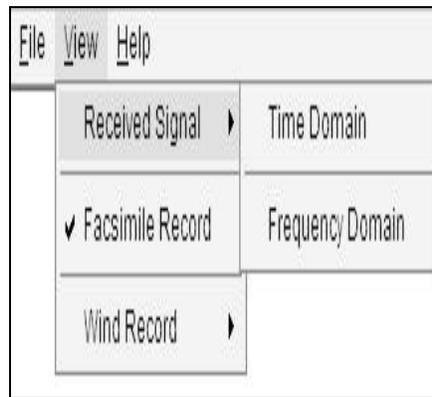


Figure 6: Pop-Up/ Drop Box of the Application of the Sodar

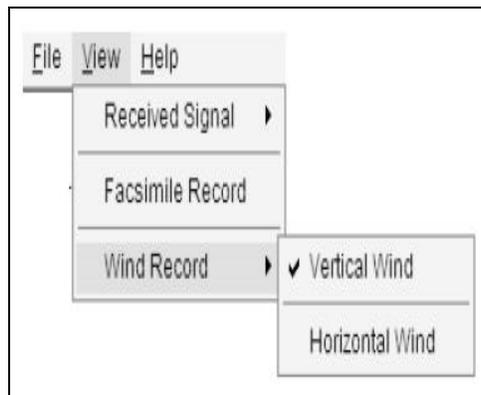


Figure 7: Pop-Up/ Drop Box Menu for Wind Record

Likewise each and every syntax will incorporated in the Pop-up/drop box menu, which can leads different parameters to begin its operation. To shutdown the sodar system for any maintenance or for any other purpose, the button 'stop' has to be clicked on the file menu drop box. In order to store the current data plots, a few software routines are added to the program itself to create appropriate folder on secondary memory of the PC. Multithreading functionality is efficiently used in this design. In such a way that all data windows and other data saving tasks are accomplished simultaneously. Every time when sodar systems starts, a new folder is created on secondary memory with dates as folder name to save the various types of sodar data files. Further, four sub-folders are also created, namely 'Raw\_wave\_Files', 'Facsimile', 'Vertical Wind', and 'Horizontal Wind' within the main-folder, which was created earlier.

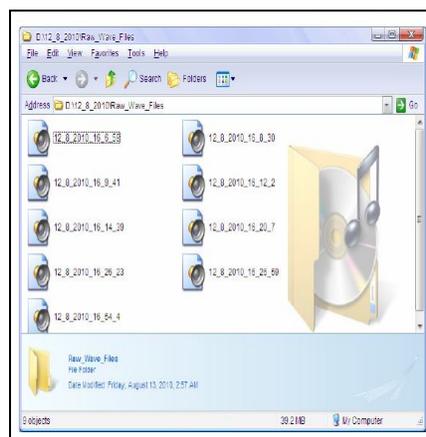


Figure 8: Window showing .Wav Files Saved With Date & Time

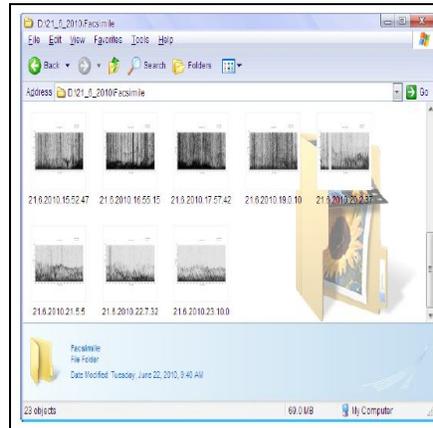


Figure 9: Window showing .Bmp Files Saved With Date & Time

### 3. Conclusion

Defining the parameters for sodar system to using object- oriented application like Microsoft VC++, will gives tremendous advantages. This object – oriented program are rich in structure, methods and attributes. This paper is divided into four different layers such as user layer, application layer, operating system layer, and Hardware / Physical layer. The user layer gives the input to the application layer by mouse click or inputs through GUI icons. The application layer performs the signal processing such as parameter determination and further communicates with the operating system layer. The operating system layer acts as a bridge between hardware layer and application layer. Finally the Hardware / Physical layer takes care of commands executions, which are given by operating system layer. Therefore designing of this software will also reduce the cost effect and hardware compellability and can use worldwide with Microsoft platform.

### 4. Acknowledgement

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## **Framework for Managing Innovations in Supply Chains of ICT Products**

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### **Abstract:**

*Information and communications technology (ICT) industry has transformed the lives of many across the globe in ways that one would have never conceived of a decade ago. One of the fundamental reasons for the growth in the ICT industry is attributed to innovation. The survival and growth of ICT companies are affected by extent they adapt innovation to provide newer and wider variety of product. Due to the innovative nature of ICT products and competitive nature of the industry, products have shorter life cycle, which further increases unpredictability of demand and risk of obsolescence. In addition, the ICT product companies have started competing on global scale through their supply chain, which requires not only being efficient and responsive, but also innovative. For ICT companies the innovations are crucial not only at the product level, but also at the process and supply chain levels. The innovations in supply chain should not be restricted to the focal firm, but would stretch to suppliers, channel partners as well as retailers. Firms having effective management of innovations in their products and also in supply chain will lead the industry and will have global outreach. This paper examines the literature and explores the various innovative practices followed by the ICT companies to establish the relationship between innovation and its management across the supply chain. The paper provides a conceptual framework for managing innovations in the supply chain of ICT products.*

**Key words:** Innovation, Supply Chain, ICT, Sustainable, Collaboration.

### **1. Introduction**

Innovation drives the industry to achieve new finished products, ingredient technologies and packaging. But the seemingly simple task of generating ideas and making them a reality becomes increasingly complex as a company grows. Because of this, more emphasis has to be placed on maintaining and nurturing the idea-generation process, which hinges on observation. These ideas are the foundation for innovation, where the entire process starts. (Christensen, 2003)

The benefits of being able to offer innovative products have become more prominent across industries where firms compete on the grounds of new products with new features, new design, and new functions. Competitive firms no longer keep offering similar products or just compete on traditional grounds such as price and quality. For technical firms especially, the inevitable trend is to differentiate product offerings by innovation in order to gain a competitive advantage over competitors. (Khin, et al. 2010).

To maintain a competitive advantage, companies also must strategize with an effective supply chain in mind. Clear communication between the marketer, the manufacturer, the retailer and all the suppliers in between can be the difference in beating a competitor to the marketplace or successfully implementing a product concept. Innovation is the key to future long term success (Christensen, 2003). In high-tech industries such as the Information and Communication Technology (ICT) industry, there is a clear difference in terms of organizational performance between firms that innovate and those that do not. The advantages of product innovation are numerous and have been well acknowledged empirically by numerous studies. (Khin, et al, 2010). The current international business environments require innovation, not only in products and their features but also across the entire business processes.

### **2. Literature Review**

The importance and widespread effect of innovation are always recognized by society and business. This can take place within processes, products, services, organizational structures, management strategies etc. Broadly it can be classified under continuous improvement or discontinuous and radical shifts in technology or ways of approaching a problem (Rogers, 1995) (Cooper, 1999)

(Kahn, 2001). Changing business environment and technological advancements increased the level of competition and also the need for innovation for survival and growth. Innovation can be focused on cost improvements, process improvements, product or service line extensions, new uses/reuse, new markets and customers or new technologies. Christmann (2000) suggested that the organizations having capabilities for process innovation and implementation will be leaders in sustainability.

Today's business environment has undergone radical transformation due to globalization and outsourcing. Organizations have to deal with intense competition in ever changing markets with greater use of information and technology to meet ever increasing expectations of consumers. The liberalization of economic policies across the globe and increased focus on environmental and social issues has made the business environment more dynamic and complex. The focus has shifted from a single organization to a network of organizations collaborating together to provide real-time solutions. Integration of business activities and collaboration with upstream and downstream partners has become an integral part of doing business. The realization of importance of integration and collaboration among the partners for efficient and economic utilization of resources leading to better profit margins among all partners; and customer service lead to an innovative idea of Supply Chain Management (SCM).

The modern idea of a supply chain is attributed to the pioneering research conducted by Jay Forrester at the Massachusetts Institute of Technology (MIT) in the 1950s. Forrester (1961) in his industrial dynamics model (widely known as Forrester effect), suggested that five flows of any economic activity namely – money, orders, materials, personnel and equipment – are interrelated by an information network, which is now called a supply chain. In the early 1980s, the concepts of transportation, distribution and materials management began to merge into a single, all-encompassing term: supply chain management. The term apparently first appeared in print in 1982, and is attributed to Keith Oliver, a consultant with Booz Allen Hamilton (Ayers, 2006). Organizations have realized that effective and efficient management of supply chains is essential for present and future survival (Olhager, et al., 2002).

Due to the short life cycle of products, companies are forced to introduce a steady stream of newer innovations (Fisher, 1997). The innovations can be incremental in nature; viz. making processes more efficient or eliminating wastes, or they may be radical like redesigning the entire supply chain. Innovation as a term is not only related to products and processes, but is also related to marketing and organization. The different types of innovations can be categorized under, new products, new methods of production, new sources of supply, exploitation of new markets, and new ways to organize business.

### *2.1. Innovation in Business Management*

Eric von Hippel in his work, "The Sources of Innovation" in the year 1988, discussed from where in the value-chain innovations came in different industries, the customer, the manufacturer, the supplier or the third party innovators such as universities, research laboratories, etc. (Philipson, 2011). He observed that the firm itself was of course the innovator in many cases. However, he identified customer involvement as key issue in successful innovation. As consumers, or other firms, start using the innovations, they often adapt or improve them, or relay information on how to do so back to the innovating firms (von Hippel, 2005). Suppliers may contribute to firm innovation by performing research and development (R&D) of its own and thus absorbing some of the R&D costs the buying firm would have to normally incur. Moreover, suppliers often have valuable knowledge of production and fulfillment processes that influence a firm's performance. Also, suppliers can transfer ideas for better products and features that could enable the buying firm to enhance products (Corsten & Felde, 2005). In some industries, he identified third parties, such as inventors, universities and independent research laboratories, as sources of innovation (Philipson, 2011). In the OECD Oslo Manual (2005), four different innovation types are introduced. These are product innovation, process innovation, marketing innovation and organizational innovation. Product and process innovations are closely related to the concept of technological developments (Gunday, et al., 2011).

Product innovations involve significant changes in the capabilities of goods or services. Both entirely new goods and services and significant improvements to existing products are included. A product innovation is the introduction of a good or service that is new or significantly improved regarding its characteristics or intended uses; including significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics (OECD Oslo Manual, 2005) (Gunday, et al., 2011).

Practitioners, policymakers, and funders likewise distinguish between innovation as process and innovation as outcome. From the point of view of process, practitioners need to know how to produce more and better innovations. Likewise, policymakers and funders need to know how to design contexts that support innovation. And from the point of view of outcome, everyone wants to know how to predict which innovations will succeed. To be considered an innovation, a process or outcome must meet two criteria. The first is novelty: Although innovations need not necessarily be original, they must be new to the user, context, or application. The second criterion is improvement. To be considered an innovation, a process or outcome must be either more effective or more efficient than preexisting alternatives. To this list of improvements we add more sustainable or more just. By sustainable we mean solutions that are environmentally as well as organizationally sustainable—those that can continue to work over a long period of time. For example, some solutions to poverty might entail natural resource extraction, such as oil drilling or fishing, which would be inherently limited by the constraints of the resource (Phills, et al., 2008).

To define social innovation more clearly, we first take a closer look at what innovation means, and then examine what social denotes. Innovation is both a process and a product. Accordingly, the academic literature on innovation divides into two different streams. One stream explores the organizational and social processes that produce innovation, such as individual creativity, organizational structure, environmental context, and social and economic factors. The other stream approaches innovation as an outcome that manifests itself in new products, product features, and production methods. This branch of research examines the sources and economic consequences of innovation. (Phills, et al., 2008). A social innovation can be a product, production process, or technology (much like innovation in

general), but it can also be a principle, an idea, a piece of legislation, a social movement, an intervention, or some combination of them. Indeed, many of the best recognized social innovations, such as microfinance, are combinations of a number of these elements. (Phills, et al., 2008).

A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Process innovations can be intended to decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products (OECD, 2005). A marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing (OECD, 2005). Marketing innovations target at addressing customer needs better, opening up new markets, or newly positioning a firm's product on the market with the intention of increasing firm's sales. Marketing innovations are strongly related to pricing strategies, product package design properties, product placement and promotion activities along the lines of four P's of marketing (Kotler, 1991). Organizational innovations refer to the implementation of new organizational methods. These can be changes in business practices, in workplace organization or in the firm's external relations. Marketing innovations involve the implementation of new marketing methods. These can include changes in product design and packaging, in product promotion and placement, and in methods for pricing goods and services (OECD, 2005). Thus, organizational innovations are strongly related with all the administrative efforts of renewing the organizational routines, procedures, mechanisms, systems etc. to promote teamwork, information sharing, coordination, collaboration, learning, and innovativeness (Gunday, et al., 2011).

## 2.2. Innovation in Supply Chain Management

The supply chain environment is characterized by globalization, increased customer responsiveness, channel integration and advances in Information and Communication Technologies (ICT). The firms increasingly rely on their supply chain partners for innovation. Firms with the ability to better manage their supply chains should experience superior supply chain innovations. Key to successful supply chain management is coordination within an organization and between its suppliers and customers (Modi, 2006). Collaboration in supply chains is important for innovation as partners realize the various benefits of innovation such as high quality, lower costs, more timely delivery, efficient operations and effective coordination of activities. (Soosay, et al., 2008).

Supply chain and logistics managers play a role in innovation in at least two ways, i.e., one by developing innovations in supply chain management processes that themselves help create a differential advantage for firms and ideally supply chains and two, by superior execution in support of product innovations developed by OEMs (original equipment manufacturers) (Flint, et al., 2008).

An intra-organizational innovation might be the application of new technologies for planning and forecasting, whereas an example of inter-organizational or market innovation might be the application of integrated product development in which suppliers and customers become part of the product development process (Santos & Smith, 2008). The degree of newness may be related to both technological innovations (new products or processes) and non-technological innovations (organizational innovation or market innovation) (Bigliardi & Dormio, 2009).

Storer & Hayland, 2009 proposed that the supply chain, like the firm, uses innovation to provide unique value adding solutions for the supply chain that provides a market competitive advantage (Storer & Hyland, 2009). Supply chain innovation has a potential role in a firm's effort to develop new products. Employing a supply chain's innovation capacity indicates the willingness of groups of actors within the supply chain to take steps, or perform activities that ultimately produce output that improves or changes current activities to meet a market need or new trajectory (Storer & Hyland, 2009). The importance of supply chain management has grown over a period of time and various planning models have been put into practice by organizations across the globe. In the competitive global environment, performance of an organization can no longer solely be determined by the decisions and actions that occur within a firm; rather it will depend on the execution of decisions and actions taken in its entire supply chain (Naslund & Williamson, 2010). The introduction of new products and services, or entry into new markets, is likely to be more successful if accompanied by innovative supply chain designs, innovative supply chain management practices, and enabling technology (Jan Stentoft, et al., 2011).

Recently much attention has been paid to innovation as a way for industry and policy makers to achieve more radical, systemic improvements in corporate environmental practices and performance. Many companies have started to use eco-innovation or similar terms to describe their contributions to sustainable development (Machiba, 2009). Eco-innovation represents innovation that results in a reduction of environmental impact, no matter whether that effect is intended or not. Eco-innovation is thus seen as an overarching concept which provides direction and vision for pursuing the overall societal changes needed to achieve sustainable development. (METI & OECD, 2010). Innovation has long been seen as central to economic performance; it is increasingly recognized as a significant driver of social welfare.

Supply chain processes involve exploitation of natural resources as well as the human capital. Supply chain management aims for efficient utilization of resources and cost reduction, and various innovations have been introduced in the way the supply chains are managed. With an increased focus on environment issues, "green" thinking was introduced in supply chain management. Numerous innovations in eliminating or minimize waste (energy, emissions, chemical/hazardous, and solid wastes) were introduced. They involved changes in green design (marketing and engineering), green procurement practices (e.g. certifying suppliers, purchasing environmentally sound materials/products), total quality environmental management (internal performance measurement, pollution prevention), environmentally friendly packaging and transportation, to the various product end-of-life practices such as reduction, reuse, remanufacturing & recycling (Hervani, et al., 2005). Reverse logistics plays a major role in ICT products which have a shorter life cycle. ICT companies have introduced schemes to encourage recycling of e-waste materials and have used innovative methods to decrease its hazardous effects. Many forward thinking IT companies have introduced innovations in products, packaging, distribution,

recycling and infrastructure that help them become more profitable as well as to minimize environmental hazards. Gupta, et al., as per their study found that though major Indian IT product companies have taken initiatives for environmental compliance, mid and small-size companies and customers at large are not even aware of such initiatives. The government policy for e-waste management and handling is facing challenges ranging from awareness to technology and skills, preparedness to mitigation, promotion to reward, and corruption to fair and transparent implementation of rules (Gupta, et al., 2013a).

Another innovation in supply chain management was introduction of concept of sustainability. This concept of sustainability corresponds with the Triple Bottom Line (TBL) perspective given by Elkington (1998) which states that, at the intersection of social, environmental, and economic performance are activities that an organization can engage in which not only are beneficial from a social and environmental standpoint, but that also make economic sense and result in competitive advantage for the firm (Elkington, 1998). The concept of sustainability in supply chain is attributed to New (1997) who argued that supply chain management in industrial society should explicitly consider ethical, political and economic implications. Organizational capability to innovate and positive management orientation towards sustainability are a precursor to sustainable supply chain management (Pagell & Wu, 2009). Gupta, et al., (2013) proposed sustainability in supply chain can be achieved not only by its economic accomplishment but also by successfully addressing the environmental and social issues through innovations. So the various supply chain actors while deciding their supply chain performance should not only consider efficiency and effectiveness but also their performance on innovation, environment and social through all levels of management, i.e. operational, tactical and strategic (Gupta, et al., 2013b).

### **3. ICT Industry in India**

The ICT industry in many countries is one of the upcoming industries with newly emerging product clusters, and it demands product innovation, which in turn creates new markets and stimulates industry growth. The rapid emergence of the Information and Communication Technology (ICT) sector has placed India on the global stage during the last one-and-a-half decades. ICT can be broadly viewed under two sectors, Information Technology (IT) and Communication Technology. India is one of the fastest-growing IT markets in the world. The Indian IT sector is broadly categorized into IT services and software, IT Enabled Services-Business Process Outsourcing (ITeS-BPO), and IT hardware products segment (OECD, 2010).

The market size of information technology in India is expected to touch US\$ 44.8 billion in 2014 as compared to US\$ 35.1 billion in 2012, as per International Data Corporation (IDC). The Indian market for IT products and services is expected to consolidate its growth achieved in 2011 and increase from US\$20.3 bn in 2012 to US\$38.7 bn by 2016 (India IT Report, 2012 by Business Monitor International). India's IT services market forecast was around US\$8.5 bn in 2012 and projected to grow to US\$17.5 bn in 2016. The Indian software market should continue to grow strongly, with software spending compounded annual growth rate (CAGR) for 2012-2016 projected at 20%. The share of hardware in total IT spending is expected by Business Monitor International (BMI) to remain above 50% during the 2012-2016 forecast period. BMI forecasts that the Personal Computer (PC) market will grow at a CAGR of 22% between 2012 and 2016. Overall, the hardware market is predicted to grow from an estimated US\$9.3 bn in 2012 to US\$16 bn in 2016, with PC sales, including accessories, projected to rise from an estimated US\$7.6 bn to US\$13 bn over the same period. The annual PC sale is expected to rise to more than 30 million units by 2016.

### **4. Methodology**

The research paper uses integrative literature review approach to propose a framework for Managing Innovations in Supply Chains of ICT products. An integrative literature review is a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated (Torraco, 2005). Perhaps the most important distinction of an integrative literature review is that it can be considered, in and of itself, a form of research that can stand alone (Yorks, 2008). Although not empirical per se, an integrative literature review does a systematic and replicable study of the literature. Since integrative literature reviews are distinctive because they systematically trace many (almost all) of the literature on a selected topic back to its roots, authors used it to review innovations which are used in business and supply chain management to propose the following framework.

### **5. Framework for Managing Innovations in Supply Chain**

There are two broad classification of supply chain, one is based on functional process i.e. procurement, production, distribution and sales, while the other one is based on factors such as supplier, manufacturer, channel partner, dealer/reseller, retailer and the customer. The functions of procurement, production, distribution and sales are termed as the value chain. The paper proposes a framework for managing innovations in supply chains using both the levels i.e. functional as well as actors.

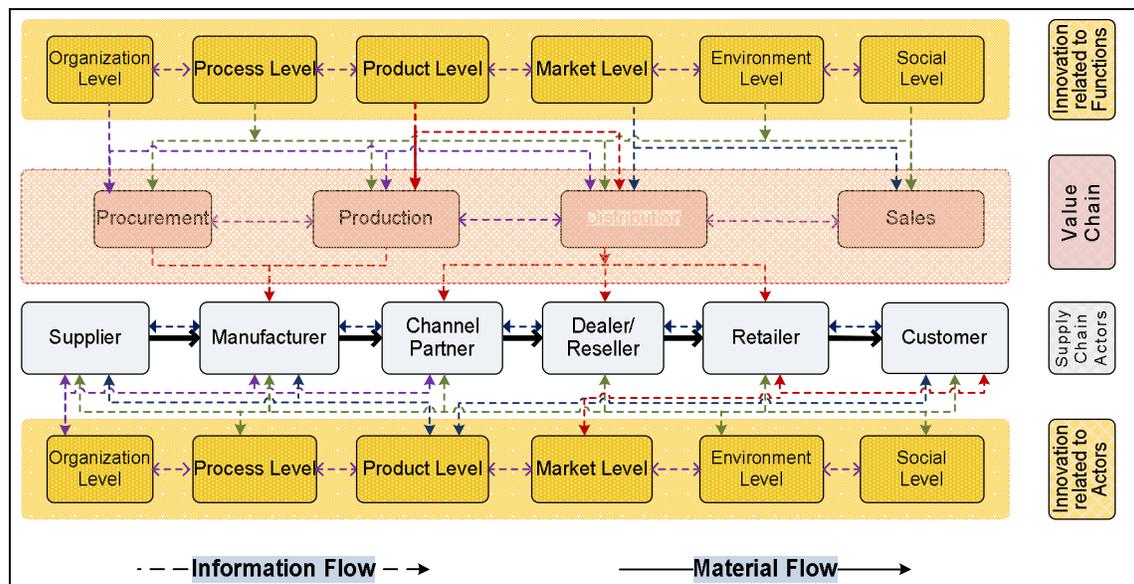


Figure 1: Framework for Innovation in Supply Chain Management

Authors have followed the Fleischmann et al. (2002) classification which divides the supply chain into four main stages or processes. Procurement involves the operations directed towards providing the raw material and resources necessary for production. Production is the next process in the chain. In this process the raw materials are converted into intermediary and/or finished products. Thereafter, distribution includes the logistics taking place to move the products either to companies further processing the product or to distribution centers, and finally to retailers. The sales process deals with all demand planning issues including customer or market selection, pricing strategy, forecasting and order promising policies.

The actors in a supply chain of ICT products generally include the supplier, manufacturer, channel partner, dealer/reseller, retailer and the customer. In general SC actors embrace innovations which increase profitability, whereas they need to be innovative to be more effective and efficient. To achieve sustainability, the innovations may take place at organizational level, process level, product level, market level, environmental level and social level. The diagrammatic representation of the framework is shown in figure 1.

In the ICT industry, innovation isn't only about new technology, instead it makes innovation an integral part of its entire operation. Innovations at organizational level may consider organizational structure and management systems. Product level innovations may consist of introduction of new product or a significant qualitative change in an existing product. Innovation is not only applied to products, it is valued in process and execution innovations. Process level may include introduction of a new process for making or delivering goods and services. Innovations at market level may comprise of dealing with competitors and customers, or for sales promotions, sales schemes and delighting the customer. Environment level innovation may spread across the supply chain, including steps taken by suppliers (reduced packaging), manufacturer (reduction in hazardous substances, energy efficient processes), distributors (reduced packaging, efficient transportation) and customers (reuse and e-waste disposal) (Gupta, et al., 2013). The social and environmental innovation capabilities are sometimes clubbed together to be named as eco-innovation which is an integral component to the dimension of sustainability to address environmental and social concerns of the SC actors. These also include the legal and policy regulations applicable for the particular industry, or a particular region/country etc.

Since the supply chain processes are spread across from the suppliers to the customers, the probability of introducing innovations is equally high across it. The organizational level of innovations is primarily introduced by the focal firm. The supply chain processes encompass involvement of all the actors including customers. These processes are under constant review and best practices are continuously introduced by way of new ideas and innovations. Similarly, changes in a product or its innovative uses can be introduced across the chain. The framework also identifies that the eco-innovation per se is a responsibility of all the SC actors. Innovation has long been seen as central to economic performance; it is increasingly recognized as a significant driver of social welfare.

### 6. Conclusion

There is no doubt that the ICT industry is one of the fastest growing industries in many countries and has a bright future ahead. But all the organizations in the ICT sector face the same challenge to remain competitive, deliver customer value, make profit, and ultimately survive and grow. And the answer lies in their capabilities to manage the innovations. These innovations are broadly categorized in product and process innovations. The product innovation can be associated with new product and or significant changes in the existing product features to address use, quality, environmental and social issues, while process innovation deals with components of value chain i.e. procurement, production, distribution and sales.

Proposed framework for managing innovation in supply chains of ICT products suggest six levels of innovations into two categories, i.e. value chain and supply chain. It shows that how these levels of innovations are interlinked with different actors of supply chain

and different functions of value chain. The framework shows and emphasizes on interrelationship and systems approach to management of innovations. The role of each actor in the supply chain for respective levels of innovations needs to be identified, incubated and managed professionally to exploit the benefits for growth and success of the organization. This is a conceptual framework for better understanding of managing innovations in the supply chains of ICT products, and it requires to be verified with practitioners in the industry.

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## Paradigm Shift from Informative Learning To Transformative Learning: A Preliminary Study

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### **Abstract:**

*In India, the perception towards the use of psychiatric methods to treat stress related problems is not appreciable. People who go for such counseling sessions are looked down upon and are treated as mentally ill by the society. In order to find out a better way of helping people to handle their work pressure, a number of participants and their thoughts were analyzed through a survey questionnaire. It was found that those people who have undergone the transformative learning sessions had a more enthusiastic approach towards their work and contributed efficiently to the overall productivity of their respective organizations. Such people performed better in terms of stress management and personality improvement. As a base of survey, “Art of Living” and Landmark Forum sessions was taken up as they were well established in this area and are also acceptable by the society.*

**Key words:** Transformative learning, cognitive behavior theory, stress management, job satisfaction, personal growth, working efficiency.

### **1. Introduction**

Transformative learning is the expansion of consciousness through the transformation of basic worldview and specific capacities of the self; transformative learning is facilitated through consciously directed processes such as appreciatively accessing and receiving the symbolic contents of the unconscious and critically analyzing underlying premises.<sup>[1]</sup>The theory of transformative learning emerged as a concept in 1978, through the work of Jack Mezirow. Since then many theories and research have been formulated.

This theory brings about a transformation in what is possible in people's lives. It gives them an awareness of the basic structures in which they know, think, and act in the world. From that awareness came a fundamental shift that leaves them more fully in accord with their own possibilities and those of others. This shift is not a one-time event, but an ongoing access to a previously untapped dimension of effectiveness and creativity. Transformative theory is a practical methodology for producing breakthroughs—achievements that are extraordinary, outside the limits of what's already predictable, attainable, or known. This training enables people to think and act beyond existing views and limits—in their personal and professional lives, relationships, and wider communities of interest. The philosophical, ethical, social, and methodological issues in adult education are raised by transformative theory and possible ways to resolve these issues.

Transformative Learning, unlike any work oriented learning operates on various levels of organizational reality. It makes the individual undergoing this training competent enough to handle levels where conceptual issues dominate and values are important and organizational purpose has to be addressed. Individual consciousness, capability of mind and heart to handle stress, and ultimately levels of individual will. This learning not only emphasizes what people do and how they do it, but also the interior condition of the individuals involved.

Cognitive Behavioral theory is one of the ways adopted in early 1980s to implement transformative learning. It is a psychotherapeutic approach that addresses dysfunctional emotions, maladaptive behaviors and cognitive processes and contents through a number of goal-oriented, explicit systematic procedures. One of the characteristics of cognitive behavioral therapy includes the use of psychiatry, but in India there is an extremely limited use of psycho-social methods of treatment. In 1973, when Varma and Ghosh did a survey on the practice of psychotherapy among Fellows of Indian Psychiatric Society, only 17% of them reported to be

using any psychological method of treatment. Today we have a much larger number of psychiatrists in this country, but the percentage of those using psychological methods of treatment is unlikely to be much greater. This limited use of psychological method in clinical practice (even in academic centres) is reflected in the publications in this area. It is found that among the papers published in Indian Journal of Psychiatry (IJP) only about 2% deal with psycho-social methods of treatment, in comparison to 16% in the British Journal of Psychiatry<sup>[2]</sup>

Most psychiatrists in India will admit that the psychological methods involved in cognitive behaviour therapy are useful or even essential in some psychiatric disorders. Often such patients are referred to psychologists or social workers who are interested in psycho-social methods of treatment. But the main concern is that, the classical cognitive behaviour therapy has not been accepted by a large portion of Indian working population.

This paper deals with the modern, sophisticated and easily accessible approach to transformative learning. In India though this approach has always been a passive part of every organizational curriculum but was never extensively followed. There was no exclusively well-defined set of training programmes/workshops to promote the concept of transformative learning, until in 1981 Shri Shri Ravishankar brought the concept of youth empowerment (Art of Living) into the gambit. But most of the people misinterpret it as some kind of God Man's spiritual theory. But later on it was widely followed by people from all over the world. It proved to be a breakthrough in the field of transformative learning. Later in 1991 an organization called Landmark came into existence in San Francisco. It offers programs in personality development. The company claims that more than 2.2 million people have taken Landmark's programs since its founding in 1991, and that it hosts courses in more than 20 countries including India.

Through this paper we are not trying to review the state of cognitive behaviour therapy in India, instead we are trying to find out a more efficacious method to help the working people tackle various day-to-day mental and behavioural problems arising due to workload. Also we have discussed what transformative learning is and its impact on people who have undergone the same and people who haven't.

## 2. Hypothesis

The organizations implementing transformative learning on their participants bring about the process of "perspective transformation" with three dimensions: psychological (changes in understanding of the self), convictional (revision of belief systems), and behavioural (changes in lifestyle) in them. Perspective transformation leading to transformative learning occurs infrequently. Mezirow believes that it usually results from a disorienting dilemma, which is triggered by a life crisis or major life transition, although it may also result from an accumulation of transformations in meaning schemes over a period of time.<sup>[3]</sup> An important part of transformative learning is for individuals to change their frames of reference by critically reflecting on their assumptions and beliefs and consciously making and implementing plans that bring about new ways of defining their worlds. This process is fundamentally rational and analytical.<sup>[4][5]</sup>

Transformative Learning methods are essential for students in an institute, because these young individuals will form the future of some organizations. So transformative learning helps them in advance to enhance their critical reflective approach towards life. Critical reflection (Figure 1) has been elevated to the major objective of adult education in the work of Mezirow (1990). Perspective transformation is the process of becoming critically aware of how and why our presuppositions have come to constrain the way we perceive, understand, and feel about our world; of reformulating these assumptions to permit a more inclusive, discriminating, permeable and integrative perspective; and of making decisions or otherwise acting on these new understandings. In other words, the real significance of adult learning appears when learners begin to re-evaluate their lives and to re-make them. Hence this learning becomes a mandatory part of their academic curriculum.

Transformative Learning offers several stress-elimination and self-development programmes to employees working in various organizations. These programmes have helped them to overcome depression and stress. It involves experiencing a deep, structural shift in the basic premises of thought, feelings, and actions. It is a shift of consciousness that dramatically and irreversibly alters their way of being in the world and obviously their respective organizations. Such a shift involves their understanding of themselves and their self-locations; their relationships with their colleagues and with the natural world; their understanding of relations of power in interlocking structures of class, race and gender; body awareness's, visions of alternative approaches to living; and sense of possibilities for social justice and peace and personal joy. In order to foster transformative learning, the educator's role is to assist learners in becoming aware and critical of assumptions. This includes their own assumptions that lead to their interpretations, beliefs, habits of mind or points of view as well as the assumptions of others. These training/workshops help employs in recognizing frames of reference. By doing so, they encourage practice in redefining problems from different perspectives. The goal is to create a community of learners who are "united in a shared experience of trying to make meaning of their life experience.

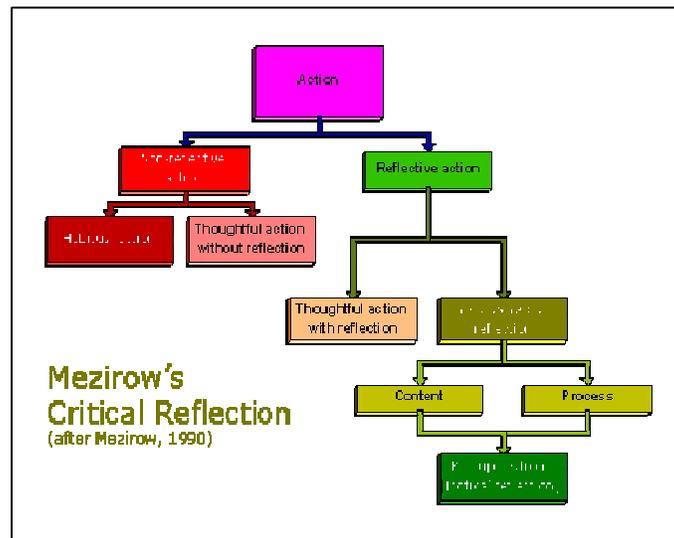


Figure 1

### 3. Method

#### 3.1. Participants

A total of sixty participants were taken up for survey which included students from colleges as well as some working people in the age group of 20-50 years. In particular, the purpose of canvassing college students was to find out if this training can help them to cope with the adverse working situations at an early stage. Further, these sixty participants were sub-divided among those who have attended transformative learning course and those who have not. Of these, 30 participants were those who attended a training of this type, which included both college students as well as working people.

#### 3.2. Design

The participants were asked to answer a Likert-scale type questionnaire to check if they are satisfied with their job and the working conditions and whether they are able to overcome the stress arising due to workload. The questionnaire also aimed to investigate their time management, social behaviour, confidence, positivity towards life, emotional intelligence and personality development. These parameters were the dependent variables of survey as they explain whether these training programs are actually helping an individual in order to increase overall working efficiency and level of efficacy for the organization. The data collected was independent of what the participant did and his/her age.

#### 3.3. Measures

The questionnaire sought answers as a level of their agreement and disagreement with various situations as was required to understand their response to the dependent variables. A very few questions also sought answer in the form of frequency to look into what they did or felt at times. This helped in understanding the contrast between the attitude and thoughts of participants and also their response to various situations which ultimately dictates the success of a work environment.

Based on the response of participants a graphical analysis is done.

### 4. Analysis

Through the survey we have tried to analyse the working efficiency of individuals working in an organization as well as students in an institute. Working efficiency is analysed with the help of certain factors like job satisfaction, stress management, personal growth, social behaviour, failure and decision making. For the analysis a stark contrast is made between the trainees and non-trainees.

The factors analysed are described below:

#### 4.1. Job Satisfaction

Factors like quality/kind of work, working environment and working hours were taken under survey. Based on the responses of trainees and non-trainees, level of job satisfaction was deduced. Figure 2, depicts the level of job satisfaction among trainees and non-trainees in various organizations and educational institutes.

It can be concluded from figure 2 that people who haven't undergone these training programmes mostly lack the level of satisfaction towards their job as compared to the people who have. Moreover, there is a slight difference between trainees and non-trainees who do agree that they are satisfied with their job. Paradoxically the trainees are more confident about their choice of careers. Ostensibly, it can also be inferred that people who haven't undergone these training programmes are in a state of dilemma regarding their choices as compared to trainees.

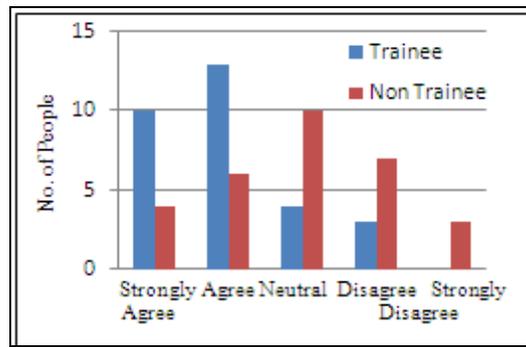


Figure 2: Job Satisfaction

Reason to this can be attributed to the psychological dimension of Mezirow’s principle i.e. the thought process of the individual during the training programme orients his/her psychology in one direction because of which they end up enhancing their critical reflective approach towards their job. On the other hand our survey depicts that non trainees mostly lack this approach.

During our survey one of the participants of the survey shared this amazing story with us. He was working in an organization for the past one and a half year. Though all the above mentioned factors about job satisfaction were favourable to him but still he wasn’t satisfied with his job. He always found himself under pressure running from one deadline to another. On the suggestion of his manager he joined one of the transformative training offered by the organization. After undergoing this training he realized that this is not the kind of work he wanted to do. Since his personal circumstances don’t allow him to quit the job, therefore he decided to carry on with it but with a changed approach i.e. instead of escaping and finding faults with the work he would rather do it effectively.

4.2. Personal Growth

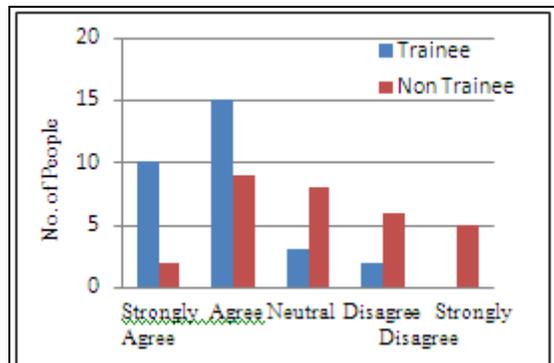


Figure.3: Personal Growth

Through this survey we tried to analyze whether the people involved are continually improving, growing, and learning every day and take charge of their professional/personal development. Here’s how:

- Development of learning perspective  
After this kind of training sessions, trainees started looking out for opportunities from where they can learn things. Their approach changed towards learning and they also started to think who can be benefitted from these things.
- Benchmarking of skills periodically  
Once a year, trainees were asked to benchmark their skills and every three months especially those who are in fast moving profession or industry. They kept looking into their portfolio to see whether it is filled with skills or competencies that are up-to-date and sought after. Or with skills that are obsolete and not very portable.
- Creating a learning plan  
Every trainee learnt to pinpoint their specific skills and knowledge that they need to acquire or upgrade. Then they could identify the professional development activities and include mentor relationships, special assignments at work, in-house and public seminars, professional conferences, online courses, journals, blogs etc.

It can be inferred from the figure 3 that trainees mostly believe in taking out time for creative thinking, visualization and emotionalisation of their goal. On the other hand the non-trainees either disagree or are neutral towards this approach.

Transformative learning makes you analyse your own self, a feeling of belongingness and dedications towards your dreams and ambitions which were suppressed due to the monotonous and cumbersome lifestyle you were living. Hence these trainees are more oriented towards the enhancement of their personal growth and a motivated way of lifestyle.

#### 4.3. Stress

Stress is the most significant factor which affects the working efficiency of employees/students in their organisation/institutes in a negative manner. Ineffective stress management can lead to decrease in working efficiency upto 50%. Job satisfaction statistics depicts this scenario among non-trainees. Infact, poor stress management often leads to job dissatisfaction. Statistical analysis shows that non trainees are often found under stress. Infact, some of them had even condemned their working hours. Not only this, poor stress handling had lead many of the non-trainees to adopt addictive means to handle their stress. Survey report reflects that more than 65% of non-trainees have an increased consumption of coffee during working hours. Also, inability to handle stress had a severe impact on college students. Some of them have become addicted to alcohol. On the contrary, trainees had reflected a better trend in stress management. Figure 4 depicts that trainees are rarely under stress. Moreover, less than 20% of trainees have an increased consumption of coffee during working hour.

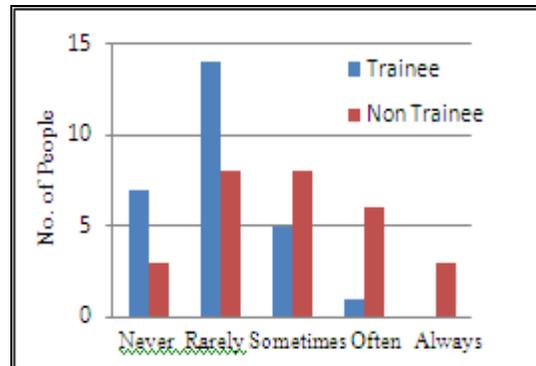


Figure 4: Stress

Figure 4 justifies that transformative learning helps in stress management. Their various stress elimination and self-development program helps in reduction of stress level. This training insists the trainee to adapt these methods in his/her day to day life. Some of these methods involve relaxation techniques like yoga, meditation etc. Hence, it can be concluded that transformative learning helps in better stress management.

#### 4.4. Decision Making

The survey reflects that, transformative learning has a remarkable impact on their trainee's decision making capabilities. It is quite evident from the responses that trainees tend to follow methodical or analytical approach during problem solving and decision making. On the contrary, most of the non-trainees blindly follow others direction. In some of the cases non trainees even follow hit and trail or random guessing approach.

Inference is quite clear, transformative learning brings a change in people's perspective through a change in their frames of reference by critically reflecting on their assumptions and beliefs and hence, transforming their thought process to a conscious decision making and problem solving approach.

#### 4.5. Failure

Survey revealed that trainees handle failure more positively compared to non-trainees. Majority of trainees take failure as a stepping stone to their success in comparison to non-trainees who either goes into depression or tends to criticize the situation. The basic fundamentals of transformative training deals with behavioural changes that accounts for more developed positive approach towards life. Hence, this can be the reason why trainee reflects a more positive approach towards life.

### 5. Conclusion

It is quite evident from the survey analysis that transformative learning has become a necessity in Indian job scenario. Knowing the fact that CBT is not accepted by a majority of people in India, transformative training is the only rescue. Moreover, the kind of contrast that came out of the survey reflects it is the need of the hour. Because, the trainees reflects greater working efficiency as compared to the non-trainees as employees as well as students. Survey not only reflects a better job satisfaction level of trainees, it also concludes that these people have more positive approach towards life. They are thoughtful decision makers, skilful stress handlers and better in time management. In fact in a survey conducted by The Times of India, they estimated that most people are in need of these transformative therapies either in the form of CBT or transformative training. Hence, we conclude that these training programs are becoming important in present job scenario for the betterment of employees as well as the organization.

This paper invites renewed curiosity in line with these principles.

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## Theoretical Analysis of User Authentication Systems

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### **Abstract:**

Effective user authentication techniques are used to protect information and system safety. Text password authentication technique is the most common computer authentication method. There are many techniques for user authentication to secure the data and information. In this paper we are theoretical analyzing some authentication techniques with their pros and cons.

**Key words:** graphical password, authentication, security, token, biometric

### **1. Introduction**

Authentication, secure operations and development of secure system; these are the most important areas for human computer interaction [1]. In the paper, our main focus is on authentication problem. Submission of username and text password is the basic authentication process which is not very secure in this era. Researches shows that the remembering the passwords are the main problem with text based password which are either simple name any of person, place, lovable thing or any dictionary word that can be easy to memorize, but these passwords can be easy to guess or break, a cracker can break these passwords by dictionary attack and brute force attacks within 30 seconds [2]. Another password is combination of alphabets, number and special symbols, but this type of passwords are difficult to memorize. Remembering different passwords for different accounts are also very difficult. In the literature, several techniques have been proposed to overcome the limitations of alphanumeric with special symbol text password technique.

### **2. Authentication Techniques**

There are four types of techniques here we are categorizing

- Text based authentication technique.
- Token based authentication technique.
- Biometric based authentication technique.
- Graphical password authentication techniques.

#### *2.1. Text Based Authentication Technique*

Text based authentication technique is simplest and widely used technique. In this, user simply enters their user name and password. User named may be some unique name or any email-id and password may be any combination of alphabets, digits and special symbols.



Figure1 Text Based Authentication

Here User name is unique according to the user or a unique email id. There are different levels of password can be selected according to the user. Simplest password is the combination of alphabets or lovable name of any person, place or things. But it can be easily cracked by hackers easily. To provide difficulty to it, user can make any combination of alphabet, digits and special symbols that is very difficult to guess by any person. But is hard to memorize but these passwords can be easy to guess or break, a cracker can break these passwords by dictionary attack and brute force attacks within 30 seconds [2].

2.2. Token Based Authentication Technique

In these days Token based techniques are widely used, the main examples of the token based technique are the smart cards, ATM card and key cards. These token based authentications techniques also use the knowledge based techniques. For example ATM cards use a PIN number.



Figure 2: ATM Card

But this techniques is also got unsecured because sometimes it happens that all the money of your account has been stolen form the ATM machine where you had got transition from ATM card.

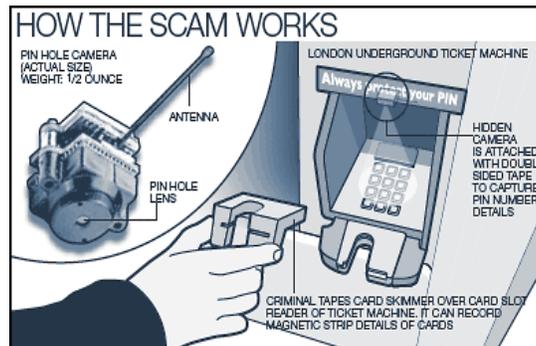


Figure 3: SCAMING Work In ATM

Hackers put a scanner where ATM inserted that scan and copy the ATM code which is encrypted in black magnetic part of ATM card and there is a hidden camera of size 0 and with a little weight about 1/2 OUNCE is fitted very secretly about the keyboard of ATM machine which copy the users secret password and sent it through small but powerful antenna to the hackers system.

So customer should be very careful when he/she get transition from ATM. Customer should be aware that there is no camera putted in the ATM machine from where you are getting transition and whenever you are entering the password from the keyboard that should be hidden from the hand or fully covered from the body so nobody can watch it outsider.



Figure 4: ATM Password Entering

### 2.3. Biometric Based Authentication Technique

Examples of Biometric based authentication techniques, such as fingerprints, iris scan, of facial recognition, are not yet widely adopted. The major drawback of this technique is that such systems improvement becomes very expensive [3]. However, this type of approach provides the highest level of security.



Figure 5: Retina Scanning

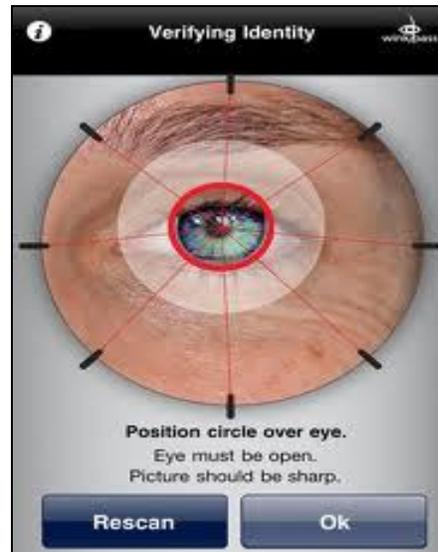


Figure 6: Verifying Identity



Figure 7: Thumb Impression

Knowledge based techniques are the most widely used authentication techniques and include both text based and picture based passwords. Here we are using the knowledge based authentication in graphical passwords scheme [4].

### 2.4. Graphical Password Authentication

Human can remember pictures better than the text based passwords or the combination of alphanumeric with symbolic passwords so the proposal is to graphical passwords are the alternative to the text based password schemes and it is more easy to use and more secure than text based password[5].

First technique is recognition based and second is recall based graphical authentication techniques.

- **Recognition Based Technique**

In recognition based techniques, user select some images and choose some points or pixel position on the images, at the time of authentication user click on the images, if the clicked points are matched with the right points, then authentication process become success.

- **Recall Based Authentication Techniques**

Second approach is recall based authentication, in which user create or selected an image which he has selected previously at the time of registration. If the reproduce thing is same as the previous thing the user become authenticated.

After applying these techniques the result are obtained that 90% of all users successfully authenticated with these techniques,

While only 70% succeeded using text based passwords [4].

### 3. Security from Password Attacks

#### 3.1. Brute Force Attack

Brute force attack uses an algorithm that produces every possible combination of words to crack the password. Text based password contain  $94^N$  number of space where 94 is the number of printable characters with space and N is the length. It has always proven successful against text based password because of its ability to check all possible combination of password [5]. That's why users are advised to select a stronger and complex password to prevent discovery from brute force attack. However, GUA proves more resistant to brute force attacks because attack software needs to produce all possible mouse motions to imitate passwords especially when trying to recall the graphical passwords [5].

#### 3.2. Dictionary Attack

If any user uses a weak password that can be crack by dictionary attack after checking the word found in dictionary. Dictionary attack on GUA would be waste of time because graphical password is a method of using mouse input type recognition [6]. It is more difficult and complex to use the automated dictionary method to produce all possibility of a single user click of an image in recall based password attack than a text based attack [6-8].

#### 3.3. Spyware Attack

This type of attack uses a small application which installed on a user's computer accidentally or secretly to record sensitive data during mouse movement or key press. This is a type of malware which secretly store this information and reports back to the attackers system. With a few exceptions, these key-loggers and listening spywares are unproven in identifying mouse movement to crack graphical passwords. Even if the movement is recorded, it is still not accurate in identifying the graphical password. Other information is needed for this type of attack namely window size and position as well as the timing [9].

#### 3.4. Shoulder Surfing Attack

Password can be identified by looking over a person's shoulder. This type of attack is more frequent in crowded areas where it is not infrequent for people to stand behind another queuing at ATM machines. There are some cases in which key pin number can be record using ceiling and wall cameras placed near ATM machines. Properly shield the keypad when entering the pin number can be avoid pin numbers being recorded or remembered by attackers [10-12].

#### 3.5. Physical Attack

When a user directly accesses to the data from the server then it is called physical attack. It makes a chance for attacker to bypass the authentication process and directly access to the resources [5]. There are two situation are created in text password and graphical password by physical attack is possible to access the image gallery and password database. In the first situation, if image gallery is accessed by attacker, it is possible to change the images and make a miss functioning for the system in next login and registration processes. If attacker access to the password database then it is possible to login to the system by any user name [13-15].

### 4. Conclusion

This paper represents the comparison between different types of authentication process. There are some pros and cons of these techniques. Text based password technique is widely used but it is very unsecured. So it is very rarely used where high level of security needed. Token based techniques are widely used at this time but there are some drawbacks of this technique. Biometric techniques are not widely used due to their initial development cost and there maintenance cost, but it is very secure. Now a days developer working on the graphical password to overcome the drawbacks of the all above techniques.

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## **Accountability of Credit Rating Services - A Study**

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### **Abstract:**

*A rating is an opinion on the future ability and legal obligation of the issuer to make timely payments of principal and interest on a specific fixed income security. Credit Rating is a simple and easy to understand symbolic indicator of the opinion of a credit rating agency about the risk involved in a borrowing programme of an issuer with reference to the capability of the issuer to repay the debt as per terms of the issue. This is neither a general purpose evaluation of the company nor a recommendation to buy, hold or sell a debt instrument. The study is made with an empirical study and it includes field survey. A questionnaire schedule method was adopted to have the information from the actual as well as the potential customers of SSI units. The study has been conducted among the sample of 50 respondents. The opinions of the customers are the source of the conclusion. From the study it is clear that all customers preferred to get the credit rating from the ONICRA credit rating agency, which is very much important for each and every SSI units. It is powerful mode of business when the SSI gets credit rating to get financial assistance and to have better title.*

**Key words:** ICRA, SSI, Instrument, Finance, Debt and Customers

### **1. Introduction**

A rating is an opinion on the future ability and legal obligation of the issuer to make timely payments of principal and interest on a specific fixed income security. The rating measures the probability that the issuer will default on the security over its life, which depending on the instrument, may be a matter of days to 30 years or more. In addition, long term ratings incorporate an assessment of the expected monetary loss should a default occur. Credit ratings help investors by providing an easily recognizable simple tool that couples a possibly unknown issuer with an informative and meaningful symbol of credit quality. Credit Rating is a simple and easy to understand symbolic indicator of the opinion of a credit rating agency about the risk involved in a borrowing programme of an issuer with reference to the capability of the issuer to repay the debt as per terms of the issue. This is neither a general-purpose evaluation of the company nor a recommendation to buy, hold or sell a debt instrument Haque N.U. Kumar K, Mark N and Mathieson D (2000). People talk about quality whenever any paid service is being received by them from any individual or from any organization. They try to order according to the merit of these organizations in rendering services. Ordering the organizations based on their merit by using some alphabetical symbol is called rating. When someone says 'A1', he means that the service rendered by an organization is the best or better than the services rendered by the other organizations in the same field. Therefore, ratings in the field of finance are a simple and easily understood tool enabling the investor to differentiate between debt instruments on the basis of their underlying credit quality. Credit rating is thus a symbolic indicator of the current opinion of the relative ability of the issuer to service debt obligations in a timely fashion with specific reference to the instrument being rated. Rating is also a communicative tool. It communicates to investors the relative ranking of the different loss probability for a given fixed income investment, in comparison with other rated instruments Nickell P, W Perrudin and Varotto S (2000).

A rating is specific to a debt instrument and is intended as a grade, an analysis of the credit risk associated with the particular instrument. It is based upon the relative capability and willingness of the issuer of the instrument to service the debt obligations (both principal and interest) as per the terms of the contract. Thus a rating is neither a general purpose evaluation of the issuer, nor an overall assessment of the credit risk likely one be involved in all the debts contracted or to be contracted by such entity Rangarajan C (1998).

## 2. Need and Importance of the Study

ICRA credit ratings provide an investor with critical information to enable him to take an informed investment decision based on his risk-return preferences. These also help investors to select the appropriate investment opportunities from a large range of options available. Credit ratings are not recommendations to buy or sell or hold a specified rated security nor are they offered as guarantees or protections against default. They are opinions only. Specific credit rating opinions are not intended to measure many of the other factors that fixed - income investors must consider in relation to risk - such as liquidity risk, pre-payment risk, interest rate risk, risk of secondary market loss, or exchange loss risk. The rating is specific to the instrument and is not the rating of the issuer Kamesam V (2002).

## 3. Scope of the Study

ICRA ratings are based on an in-depth study of the industry as also an evaluation of the strengths and weaknesses of the company. The inherent protective factors, marketing strategies, competitive edge, level of technological development, operational efficiency, competence and effectiveness of management, hedging of risks, cash flow, trends and potential, liquidity, financial flexibility, government policies, past record of debt servicing, sensitivity to possible changes in business/economic circumstances are looked into. Once the company has accepted a rating, ICRA continuously monitors the corporate and the rating is monitored till the life of the instrument. The process is known as surveillance. During the surveillance period, all changes affecting the company are taken into account and the rating, if necessary, is changed, upwards or downwards. In other words, a rating is valid during the life of the instrument unless is changed. ICRA maintains absolute independence from market participants to provide unbiased opinions. The ratings are a result of collective judgment of committee members. ICRA's in-house research and database ensure that opinions are supported by objective benchmarks and comparison Shah A and Thomas S. (1997).

## 4. Research Methodology

The study is made with an empirical study and it includes field survey. A questionnaire schedule method was adopted to have the information from the actual as well as the potential customers of SSI units. The questionnaire highlighted the data identification as well as the note of various constraints faced by the respondents. The actual questionnaire schedule used for the purpose is annexed to the study. The survey was conducted on 50 customers belongs to different small scale industries. The researcher has adopted descriptive research design for conducting the survey where by the researcher would describe the satisfaction levels of the customers regarding obtaining the credit rating certificate. The researcher has decided to make use of both primary and secondary data to have clear-cut information on the study topic. The researcher has collected the first hand information for the survey through a structured questionnaire among the customers who requires credit rating certificate. The researcher has collected information through journals and other standard reference books on the subject. The information collected by the primary method have been systematically tabulated and analysed with the help of statistical tools like percentages, rank method and chi-square test. The information also has been depicted in the form of charts and diagrams.

## 5. Evolution of Credit Rating And

In 1837, there existed a financial crisis in America. Credit rating had its origin from there, Due to the crisis, financial obligation of many organizations in USA mounted up. The first mercantile credit rating agency was set up in New York in 1841. The purpose of establishing the agency was to rate the ability of the merchants to pay financial obligations. Robert Dun took over the agency later. It published its first rating guide in 1859. John Bradstreet set up the second credit rating agency in 1849. It published a rating book in 1857. In 1933, these two agencies were merged to form Dun & Bradstreet. In 1990, John Moody established Moody's Investor Service. He published in 1909 the Manual of Railroad Securities. Moody further published a rating of utility and industrial bonds in 1914 and the rating of bonds issued by American cities and other municipalities in the early 1920s. Poor's Publishing Company brought out their rating issue for the first time in 1916. Standard Statistics Company followed the suit in 1922. These two organizations were merged in 1941 to form a Standard and Poor's which was subsequently taken over by McGraw Hill in 1966. A number of credit rating agencies were set up in 1970s. These included the Canadian Bond Rating Services, Thompson Bank watch, Japanese Bond Rating Institute, McCarthy Crisitani and Maffei, Dominican Bond Service, IBCA Ltd., and Duff and Phelps Credit Rating Company.

The first credit rating agency established in India was the Credit Rating and Information Services of India (CRISIL). It was set up in 1987. This was followed by the setting up of ICRA in 1994. This was formerly called as Investment Information and Credit Rating Agency of India Ltd. Credit Analysis and Research Ltd. (CARE) was set up in 1994. In 1996, Duff & Phelps Credit Rating (P) Ltd. was set up by Duff & Phelps in association with Indian non-banking finance companies (NBFCs).

## 6. Beneficiaries of the Rating Services

The rating provides the investors with an independent and professional judgment of the credit quality of the instrument, which the individual investor would not otherwise be able to evaluate. Rating provides low cost supplement to the in-house appraisal system of organized institutional investors. The rating replaces name recognition by objective opinion. Large institutional and other investors also make use of these ratings to make investment decisions. The issuers of rated securities are expected to have an access to a wider investor base. Credit rating provides a basis for determining the returns compared to the risks involved or perceived. This could be a useful benchmark for issue pricing and result in savings in costs.

Intermediaries like investment and merchant bankers and other market players use the rating for pricing, in placement and marketing the issues. The ratings are used in case of asset securitisation and structured obligation. The rating makes the exposure levels and risk undertaking decisions easy. The regulators have set certain benchmarks and rules for various market intermediaries or financial intuitions, etc. based on the rating for investment, exposure and dealings.

## 7. Data Analysis

### 7.1. SSI Certificate of the Respondents

SSI Certificate is very much required by the small scale industries. This certificate will be given only when the small scale industries have their own plant and machinery worth of less than 5 crores. This also helps to get subsidy from the government of India through NSIC (National Small Industries Corporation).

SSI Certificate	No. of Respondents	Percentage
Yes	50	100
No	0	0
Total	50	50

Table 1

Source: Questionnaire

From the above table, it is clear that out of 50 respondents, 50(100%) of respondents own SSI Certificate. Thus it is found that all the SSI units felt that they require certificate for smooth and better performance.

### 7.2. ISO Certificate of Respondents

ISO Certificate is an important instrument for SSI units. It reflects the quality of each units to win the markets and to have better position in business dealings.

ISO Certificate	No. of Respondents	Percentage
Yes	10	20
No	40	80

Table 2

Source: Questionnaire

From the above table it is clear that out of 50 respondents, 10(20%) respondents own ISO Certificate and 40(80%) of respondents does not own ISO Certificate. This analysis reveals that the majority of the respondents does not own ISO Certificate and it is not mandatory to run their business operations.

### 7.3. Credit Rating Certificate of the Respondents

Credit rating certificate provides a better title to SSI units to get various financial assistance from different sources and to have qualitative strength to their operations and the certificates are renewable in nature.

Details	No. of respondents	Percentage
Fresh	40	80
Renewal	10	20
Total	50	100

Table 3

Source: Questionnaire

From the above table it is found that, out of 50 respondents, 40(80%) respondents are fresh applicants who are seeking for the certificate and the rest of the respondents about 10(20%) have already owns credit rating certificate.

### 7.4. Nature of SSI Operations

SSI has different operations according to their capital and the number the employees. It consists of various small industrial units who engage in automobile industries, plastic industries, chemical industries and packing industries.

Details	No. of respondents	Percentage
Automobile	30	60
Plastic	10	20
Chemical	7	14
Packing	2	4
Others	1	2
Total	50	100

Table 4

Source: Questionnaire

From the above table, it is clear that out of 50 respondents, 30(60%) respondents belongs to automobile industries, 10(20%) belongs to plastic industries, 7(14%) belongs to chemical industries, 3(6%) belongs to packing industries and 1(2%) belongs to other industries. Thus it is concluded that majority of the respondents are from automobile industries and a minority of the respondents are from other industries.

#### 7.5. Financial Assistance of the Respondents

Requirement of financial assistance is an essential element of the credit rating activity in India. SSI units get better title to get financial assistance from various sources and subsequently if they opt for credit rating that could improve the activities of SSI to earn more returns.

Requirement	No. of respondents	Percentage
Below 10 lakhs	40	80
Above 10 lakhs	10	20
Total	50	100

Table 5

Source: Questionnaire

From the above table, it is seen that out of 50 respondents 40(80%) of respondents requires financial assistance of below 10 lakhs and 10(20%) respondents requires financial assistance of above 10 lakhs. Thus it is clear that majority of the entire respondents requires financial assistance of below 10 lakhs.

#### 7.6. Financial Assistance Provided By Banker

Information of the banker is very much important in getting financial assistance through credit rating facility. Banks provides more financial assistance to SSI units.

Bank	No. of respondents	Percentage
Indian bank	15	30
IOB	10	20
SBI	10	20
Syndicate bank	8	16
Canara bank	7	14
Total	50	100

Table 6

Source: Questionnaire

From the above table it is found that, out of 50 respondents 15(30%) respondents belongs to the customers of Indian bank, 10(20%) belongs to IOB, 10(20%) belongs to SBI, 8(16%) belongs to syndicate bank and 7(14%) belongs to Canara bank. This it is clear that the majority of the respondents are the customers of Indian bank.

### 7.7. Annual Turnover

It is important to know the annual turnover of the SSI units. Credit rating agencies charges certificate fee according to the turnover of the SSI units.

Turnover	No. of respondents	Percentage
Below 50 lakhs	40	80
50 – 200 lakhs	6	12
Above 200 lakhs	4	8
Total	50	100

Table 7

Source: Questionnaire

The above table shows that out of 50 respondents 40(80%) respondents had turnover of less than 50 lakhs, 6(12%) respondents had turnover between 50 lakhs and 200 lakhs and 4(8%) respondents had turnover between 200 lakhs and above.

### 7.8. NSIC Assistance

National small industries corporation is a body of central government established by the Ministry of Government to assist through subsidy to various SSI units.

Need	No. of respondents	Percentage
Yes	50	100
No	0	0
Total	50	100

Table 8

Source: Questionnaire

From the above table, it can be understood that out of 50 respondents entire respondents expressed their willing to get financial assistance from NSIC.

### 8. Obtaining the Credit Rating Certificate and Customer Satisfaction With Regard To Nature of the Industries of the Respondents

To find out the relationship between obtaining the credit rating certificate and customer satisfaction of the respondents, the researcher has adopted chi-square test as statistical tool to test the formulated hypothesis in the study.

- Ho There is no relationship between obtaining credit rating certificate and the nature of the industries of the respondents.
- H1 There is relationship between obtaining the credit rating certificate and the nature of industry of the respondents.

### 9. Obtaining the Credit Rating Certificate and Customer Satisfaction With Regard To Nature of Industry of the Respondents

Nature of industries	O	E	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
Automobile	30	10	20	400	40
Plastic	10	10	0	0	0
Chemical	7	10	-3	9	.90
Packing	2	10	-8	64	6.40
Others	1	10	-9	81	8.10
				Total	55.40

Table 9

$$E[(O-E)^2/E] = 55.40$$

Calculated Value = 55.40

Tabulated value at 5% level of significance for degrees of freedom.

$$(5-1) = 4$$

Degrees of freedom = 4

So null hypothesis Ho is rejected. Thus there is relationship between obtaining the credit rating certificate and the nature of industry of the respondents.

### 10. Obtaining the Credit Rating Certificate and Customer Satisfaction With Regard To Information of the Banker

To know the relationship between obtaining credit rating certificate and the information of the banker, the researcher has adopted chi-square test as statistical tool to test the formulated hypothesis in the study.

- Ho There is no relationship between obtaining credit rating certificate and custom satisfaction with regard to information of the banker.
- H1 There is relationship between obtaining credit rating certificate and customers satisfaction with regard to information of the banker.

### 11. Obtaining the Credit Rating Certificate and Customer Satisfaction With Regard To Information of the Banker

Banker	O	E	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
Indian Bank	15	10	5	25	2.5
IOB	10	10	0	0	0
SBI	10	10	0	0	0
Syndicate Bank	8	10	-2	4	.40
Canara Bank	7	10	-3	9	.90
				Total	3.80

Table 10

$$E[(O-E)^2/E] = 3.80$$

Calculated Value = 3.80

Tabulated value at 5% level of significance for degrees of freedom.

$$= (5-1) = 4$$

Degrees of freedom = 4

So null hypothesis Ho is rejected. Thus there is relationship between obtaining the credit rating certificate and information of the banker.

### 12. A Summary of Findings, Suggestion and Conclusion

The findings, suggestion and conclusion of the earlier chapters are summarized in the following pages. The study has been a survey with the help of questionnaire, among 50 respondents using convenience sampling methods, to determine the consumer satisfaction on obtaining credit rating among the respondents. The summary has depicted the following findings. It is found from the table No.1 that entire 50(100%) respondents own SSI certificate. It is clear from the above findings that obtaining credit rating certificate is mainly influenced on those who owns SSI certificate. The table No.2 shows that 40(80%) respondents does not own ISO certificate. It is clear from the above findings that the obtaining credit rating certificate does not require ISO certificate.

It can be seen from the table No.3 that 40(80%) respondents does not possess credit rating certificate earlier. It is clear from the study that the new SSI units always urge to get the credit rating certificate. It is found from the table No.4 that 30(60%) respondents relate to automobile industries. Thus we can conclude that automobile industries prefer to obtain credit rating certificate. It is known from the table No.5 that 40(80%) respondents require financial assistance of less than to lakhs. Thus it is clear that the credit rating certificate mostly helps the SSI units to get sources adequate financial assistance from various sources.

It is found from the table No.6 that 15(30%) respondents had banking transaction with Indian Bank. It is clear that most of the respondents prefer to get financial assistance through credit rating from Indian bank. It can be seen from the table No.7 that 40(80%) respondents earns annual turnover of below 50 lakhs. It is clear that most of the respondents prefers for obtaining credit rating facility are average businessmen. It is found from the table No.8 that entire 50(100%) respondents requires the NSIC Assistance. It is clear that each and every SSI unit requires NSIC Assistance to get funds and concession from the government. The Chi-square test has proved that there is relationship between obtaining the credit rating certificate and the nature of industry of the respondents and obtaining the credit rating certificate and information of the banker.

#### 12.1. Suggestions

It is suggested from the study that only the credit rating agencies give an opinion regarding the general credit worthiness of the SSI and its performance. It includes an objective assessment of the SSI unit by credit rating agencies on operating performance, infrastructure facilities, viability of system, buyer's and vendors satisfaction, financial resources, credit worthiness, existing working capital arrangements, management style, motivational, commitment levels and life style of the promoters.

National small industries corporation (NSIC) which is a body of central government also plays a vital role in providing subsidies, advises to SSI and also assisting to credit rating agencies. All SSI units are advised to go through the process for future prospectus. SSI units are to be provided with required information with regard to the benefits of the credit rating and the procedures to be followed in obtaining the credit rating facility. Few small scale industrial units who require financial assistance prefer for the credit rating operations. It is suggested that all the small scale industrial units need to undergo the credit rating operations to claim vast resources.

### 12.2. Conclusion

Credit ratings are based on in depth study of the each and every activity of the SSI units and corporations. It reflects on marketing strategies, competitiveness, technological development, liquidity, financial flexibility and government policies. Credit rating is beneficial to investors, issuers, intermediaries and regulators. Onicra helps SSI nits who require financial assistance on their credit worthiness, financial viability and performance. Credit rating services are inevitable for bonds, debentures, fixed deposit programmes, commercial papers, structured debt obligations etc. The study has been conducted among the sample of 50 respondents. The opinion of the customers is the source of the conclusion. From the study it is clear that all customers preferred to get the credit rating from the ONICRA credit rating agency, which is very much important for each and every SSI units. It is powerful mode of business when the SSI gets credit rating to get financial assistance and to have better title.

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## User Based Collaborative Filtering for Music Recommendation System

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### **Abstract:**

*Recommender systems have been proven to be valuable means for web online users to cope with the information overload and have become one of the most powerful and popular tools in electronic commerce. The recommendations provided are aimed at supporting their users in various decision making process, such as what items to buy. In this paper we recommend items to users based on their logs. First we use collaborative filtering method to identify the users who are similar based on their listening history. Then recommend the items to new users based on the user clusters formed. At last we have evaluated the performance of the algorithm and propose the ideas that improve the recommendations.*

**Key words:** collaborative filtering, recommender system, clustering

### **1. Introduction**

With the expansion of the Internet and the advent of smart phones, people now are able to get easy access to and extend their activities on the Web. The domestic Internet usage rate reached 78%, and the number of Smartphone users totaled 30 million in 2012 [1]. Under these environmental changes, today's users have an enormous amount of information within their reach and can see it increase exponentially. In the flood of such information, they want to have a means to search for desired information easily and quickly. In attempts to achieve this, portals have created and posted a list of search words that have been most sought, while shopping malls have provided a lineup of hot-selling items. Users want to search for their required information in the flood of information easily and quickly. To cope with these demands, portals have created and posted a list of search words that have been most sought, and shops have provided information on most sought-after products in their catalogues. However, these methods do not seem to offer help with the user's decision-making due to their inability to reflect the characteristics of individual users. Personalized services mean providing consumers with products and services most suitable to individual tastes based on their personal information, but without explicit questions about their desired products and services [2]. Among personalized services, recommender systems make recommendations of services or products that target customers might like. A wide range of recommender systems have been developed and also widely adopted by such Internet shopping malls as Amazon and CD Now [3]. Among these, collaborative filtering systems have been known to be the most successful method, and have found a variety of applications in Web pages, movies, thesis, and newspaper articles [4-6].

Collaborative filtering, which is the most widely used technique in music recommendation systems, is a method of making automatic recommendations of certain items by creating profiles based on diverse kinds of information collected from multiple users, and subsequently making predictions based on these profiles, about the interests of a user who has preferences similar to other like-minded users. In a collaborative filtering system, users give preference ratings to items based on their taste. After that, the system calculates preference similarities among users from such ratings, and makes predictions about a user's rating for a product which the user has not rated yet. A collaborative filtering system is designed to analyze a user's ratings given on the same product and predicts the user's rating for a product which the user has not rated yet. Accordingly, many users are required to make ratings on many items to come up with better recommendations. However, users are normally unable to assess all the items in the system, which always presents a fundamental problem named 'rating sparsity' to the collaborative filtering systems [7].

Music recommender systems are decision support tools that help tame the information overload by recommending only the items that are estimated as relevant to the user, based on the user's music preferences [8]. For example, Last.fm<sup>1</sup> a popular Internet radio and

recommender system that allows a user to mark songs or artists as favorites, and based on this information can identify and recommend music content that is likely to be of interest to the user.

This paper uses user listening history for collaborative filtering system based on user clusters in music recommendation systems. The rest of the paper is organized as follows. In Section 2 we explained fundamentals of the recommendation systems. Section 3 describes about the proposed algorithm for recommendation and evaluation measures used in the proposed system. Experimental setup, Data set used in experiment and results are discussed in Section 4. Conclusion and future scope is explained in Section 5.

## **2. Related Works**

This section describes collaborative filtering system, such details as recommender systems, personalization techniques, and methods of selecting collaborative filtering systems that are required for the recommendation of music.

### *2.1. Recommender System*

A recommender system makes recommendation of products that are suitable for a customer's demands, based on the analysis of such information as products that many customers are interested in, demographic data, and past purchasing activity [8]. Personalized services tailored to individual tastes have been emphasized in e-commerce transactions. Personalization means the process of quickly responding on the Internet to a customer's needs that are unique and specific. Web personalization is defined as activity made on the Internet by an individual in response to his/her interests or tastes [9]. The reasons why personalized service is important are that customers can reduce their attempts to search for products, and companies not only increase customers' loyalty to their e-commerce sites through the recommendation of proper products but also build attachment between them and their customers [10].

### *2.2. Personalization Techniques*

The personalization techniques for recommender systems include:

#### 2.2.1. Content-Based Recommender System

This system analyzes item information and recommends certain items to users. It is suitable for recommendation of such items as texts, documents, news, and web pages whose contents are abundant and easy to analyze [14].

#### 2.2.2. Rule-Based Filtering

This technique specializes in the acquisition of users' information profiles by means of questions to users about their interests and preferences. Users' profiles can be obtained by asking questions about the users' tastes and preferences on particulars and collecting and analyzing their answers. This filtering system recommends to users or provides them with information about products that are considered to be suitable given a user's psychological and preference information based on such profiles [10].

#### 2.2.3. Demographic Filtering

This system makes recommendations using users' information such as age, sex, and education level [12]. Demographic attributes have an advantage of making an easy analysis of users' preferences regarding various kinds of items and item categories.

#### 2.2.4. Collaborative Filtering

This system makes recommendations by utilizing each user's assessment information [13]. As a collaborative filtering system makes use of rating information, it has an advantage of performing recommendations without the information on a user or on a specific item.

#### 2.2.5. Learning Agent-Based Filtering System

This personalization technique utilizes learning agents that are designed to trace users' attributes, habits, and personal preferences through the analysis of log files including records of visit to websites and their frequency, access location, and time [11].

A recommender system is a program which makes predictions about relations among customers or among items, and searches for items that a user may be expectedly to desire. The purpose of many studies on recommender systems have mainly focused on their capability of how likely they are able to recommend products that a customer is satisfied with. Collaborative filtering is the method most frequently used to categorize similarities among items.

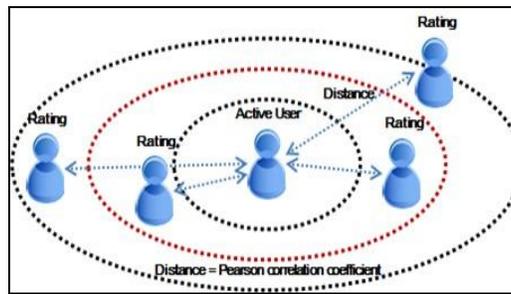


Figure 1: Collaborative Filtering Algorithm

Fig. 1 shows a neighborhood-based algorithm that has generally been used in collaborative filtering systems [7]. The active user calculates distances to other users and selects as its neighbors the number of users who are located at nearest distances. The distance between users can be calculated using the Pearson correlation coefficient, the mean-square difference, or vector similarity. In [13], the Pearson correlation coefficient produced a better result than the vector similarity, and [19] showed that the Pearson correlation coefficient brought about a better outcome though a selection of either a too small or too large number of neighbors might lead to a reduction in its prediction capability. When distances to other users have been calculated, a predicted score for an item can be computed by summing other users' rated scores in proportion to their distance weights, using the following equation [7].

$$P_{a,i} = r_a + \frac{\sum_{u=1}^n (r_{u,i} - \bar{r}_u) * W_{a,u}}{\sum_{u=1}^n W_{a,u}}$$

Equation is introduced to calculate a distance through the Pearson correlation coefficient. ' $P_{a,i}$ ' indicates an active user 'a's prediction about an item 'i'. 'n' is the number of the neighboring users, ' $r_{u,i}$ ' means the rating of a user 'u' on an item 'i', and ' $w_{a,u}$ ' is defined as the weighted similarity between the active user 'a' and its neighbor 'u' [5].

The Pearson correlation coefficient has a number close to '1' when a user A rates a movie high that a user B has also rated high and user A also gives a low rating to a movie that the user B has given a low rating; and, it is close to '0' when the vice versa holds true.

### 2.3. Approaches To Collaborative Filtering

There are two kinds of collaborative filtering: user-based collaborative filtering and item-based collaborative filtering.

#### 2.3.1. User-Based Collaborative Filtering

This approach is to calculate distances to quantify how closely two users match each other in respect with a certain common item. For example, if user1 and user2 put in same ratings in the same item, the distance will be 0. On the other hand, assuming they give different ratings, the distance will be farther depending on the difference.

#### 2.3.2. Item-Based Collaborative Filtering

Most recommender systems utilize an item-based collaborative filtering technique rather than a user-based one. For instance, when users who like item1 also like item2, the distance between two items is regarded as being close.

## 3. Proposed Approach for Recommendations

This section describes about the similarity measures used, forming the clusters of similar users, recommendation of items to new users and evaluation measures.

### 3.1. Similarity Measures

#### 3.1.1. Cosine Similarity Measure

Similarity is a measure of similarity between two vectors of an inner product space that measures the cosine of the angle between them. The cosine of  $0^\circ$  is 1, and it is less than 1 for any other angle. It is thus a judgment of orientation and not magnitude: two vectors with the same orientation have a Cosine similarity of 1, two vectors at  $90^\circ$  have a similarity of 0, and two vectors diametrically opposed have a similarity of -1, independent of their magnitude. Cosine similarity is particularly used in positive space, where the outcome is neatly bounded in  $[0,1]$ .

The technique is also used to compare documents in text mining. In addition, it is used to measure cohesion within clusters in the field of mining. One of the reasons for the popularity of Cosine similarity is that it is very efficient to evaluate, especially for sparse vectors, as only the non-zero dimensions need to be considered.

The cosine of two vectors can be derived by using the Euclidean dot product formula:

$$\mathbf{a} \cdot \mathbf{b} = \|\mathbf{a}\| \|\mathbf{b}\| \cos \theta$$

Given two vectors of attributes, A and B, the cosine similarity,  $\cos(\theta)$ , is represented using a dot product and magnitude as

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\| \|\mathbf{B}\|} = \frac{\sum_{i=1}^n A_i \times B_i}{\sqrt{\sum_{i=1}^n (A_i)^2} \times \sqrt{\sum_{i=1}^n (B_i)^2}}$$

The resulting similarity ranges from  $-1$  meaning exactly opposite, to  $1$  meaning exactly the same, with  $0$  usually indicating independence, and in-between values indicating intermediate similarity or dissimilarity. For text matching, the attribute vectors A and B are usually the term frequency vectors of the documents. The cosine similarity can be seen as a method of normalizing document length during comparison.

In the case of information retrieval, the cosine similarity of two documents will range from  $0$  to  $1$ , since the term frequencies (tf-idf weights) cannot be negative. The angle between two term frequency vectors cannot be greater than  $90^\circ$ .

### 3.2. Formation Of Clusters By Using K-Means Algorithm

Once the similarity between the users is found by using cosine similarity measure, the next step is to form the user clusters based on this similarity measure. We used a threshold value and based on the value users are clustered into different clusters. The following is the Algorithm used to form user clusters.

#### Algorithm Threshold\_Kmeans()

```

Begin
Initialize the threshold value to th_cutoff
For each user in  $u_1, u_2, \dots, u_n$ 
Put  $u_1$  into  $C_1$  cluster and find the similarity with  $u_2$ 
Put  $u_2$  into  $C_1$  if the similarity is within the similarity threshold th_cutoff
Otherwise create a new cluster  $C_2$ 
Repeat this for all users and all Clusters
Return the clusters  $C_1, C_2, \dots, C_k$ 
End

```

### 3.3. Recommendation

After getting the user clusters, we used these clusters to recommend items to new users. Use the following Algorithm for recommendations

#### Algorithm Recommendation ()

```

Begin
For each new user
Find the similarity with each cluster mean
Find the cluster with highest similarity
Then recommend the items preferred by the users in the cluster
End

```

### 3.4. Evaluation Measures

Many methods have been proposed for assessing the accuracy of collaborative filtering methods. We have used mean Average Precision (mAP) as the measure.

The mAP metric emphasizes the top recommendations, and is commonly used throughout the information retrieval literature. For any  $k$ , the precision-at- $k$  ( $P_k$ ) is the proportion of correct recommendations within the top- $k$  of the predicted ranking:

$$P_k(u,y) = \frac{1}{k} \sum_{j=1}^k M_{u,y}(j)$$

for each user, we now take the average precision at each recall point:

r

$$AP(u,y) = \frac{1}{n_u} \sum_{k=1} P_k(u,y) * M_{u,y}(k)$$

where  $n_u$  is the number of positively associated songs for user  $u$ . Finally, averaging over all  $m$  users, we have the mean average precision:

$$mAP = \frac{1}{m} \sum_u AP(u, y_u)$$

where  $y_u$  is the ranking predicted for user  $u$ .

#### 4. Experiment and Results

This section describes about the Dataset used for experiment, experimental set up and results.

##### 4.1. Data set

Million Song Dataset (MSD) a freely-available collection of audio features and meta-data for a million con- temporary popular music tracks [7]. Comprising several complementary datasets that are linked to the same set of songs, the MSD contains extensive meta-data, audio features, tags on the artist- and song-level, lyrics, cover songs, similar artists, and similar songs. It consists of four datasets namely Last.fm, Second hand data set, Musixmatch and Taste profile data set. We used taste profile Data set for our experiment

##### 4.1.1. Taste Profiles

The collection of data we use is known as the Taste Profile [15] Subset. It consists of more than 48 million triplets (*user, song, count*) gathered from user listening histories. The data was provided by an undisclosed set of applications, where each user could select the song they wanted to listen to. The data consists of approximately 1.2 million users, and covers more than 380,000 songs in MSD. A raw sample of the data is shown in Fig 2.

User ID	Song ID	Play Count
b80344d063b5ccb3..	SOYHEPA12A8C13097	8
b80344d063b5ccb3..	SOYYWMD12A68A7BCC	1
b80344d063b5ccb3..	SOZGCU812A8C13399	1
b80344d063b5ccb3..	SOZO8WV12A8C130999	1
b80344d063b5ccb3..	SOZZHX112A8C13B7D	1
85c1f87fea955d09...	SOACWYB12AF729E581	2
85c1f87fea955d09...	SOAUSXX12A8C136188	1
85c1f87fea955d09...	SOBVAHM12A8C13C4CB	1
85c1f87fea955d09...	SODJTHN12AF72A8FCD	2

Figure 2: A few lines of the raw data of the Taste Profile Subset <http://labrosa.ee.columbia.edu/millionsong/tasteprofile> The three columns are user ID, song ID and play count. The user ID's have been truncated for visualization purposes.

##### 4.2. Experimental Setup

We have taken 10000 records from Taste profile data set for experiment. It consists of 198 unique users and 7453 unique items. We have taken only those users who listened at least 30 songs and those songs which are listened by at least two users. With these constraints we got 98 unique users and 254 unique songs as shown in Fig 3.. We formed clusters by taking 60 users as training data and 38 users as test data.

User Id/ Song Id	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>
U <sub>1</sub>	2	5	0	5	11	0	0	0
U <sub>2</sub>	0	1	0	0	4	3	0	2
U <sub>3</sub>	0	0	0	0	2	0	0	0
U <sub>4</sub>	0	2	5	0	7	2	4	4
U <sub>5</sub>	1	3	0	0	0	0	0	0
U <sub>6</sub>	5	0	3	0	0	3	0	0

Figure 3: Part of User- Item Matrix with Rows as Users, Columns as Songs

##### 4.3. Results

We have done the experiment with various values of thresholds such 0.2, 0.25 and so on till 0.9.

We plotted the graph for threshold vs mAP and threshold vs no. of clusters. We can conclude from that as the threshold value increases the mAP also increases and number of clusters increases.

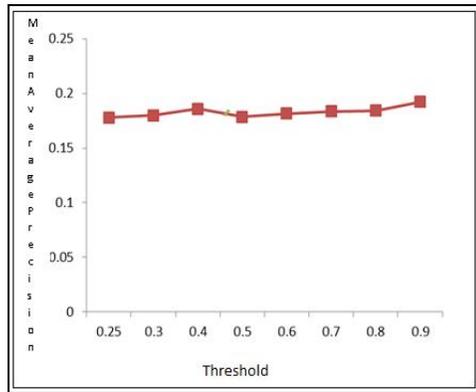


Figure 4

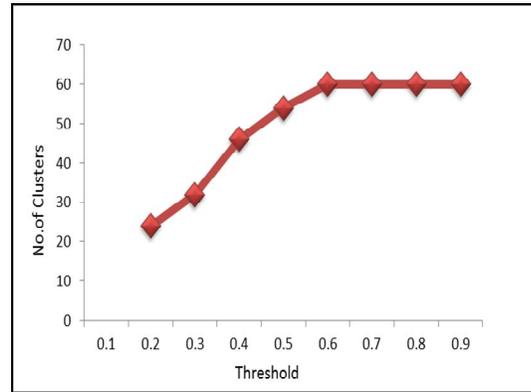


Figure 5

## 5. Conclusion and Future Scope

We have discussed about the user based collaborative filtering method for music recommendation system. This system is taking the user interest into consideration without taking the user feedback explicitly. We also evaluated our system on benchmark dataset. This work can be extended for recommendations by taking the time at which user listens a particular item also into consideration.

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## **The Evolution of ICT as A to Z General: Purpose Technologies for Business Innovation**

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### **Abstract:**

*Information and communications technology applications are present practically in every aspect of life; they shape our private lives as well as our work. ICT is becoming increasingly important on a macroeconomic level continuously. Not only is the ICT industry a steadily growing sector with a high economic significance, ICT-based solutions and technologies are also making a valuable and very important contribution to value-creation in other sectors, e.g. trade or manufacturing industries, in all aspects of business.*

**Key words:** Information and Communication Technology (ICT), E-Commerce, Cloud Computing, QIK, Xcode, Off the shelf, VOIP

### **1. Introduction**

The ICT sector has been a priority and a powerful catalyst in catering the needs and interest of low income communities in developing countries. Only in past twenty years has a self – conscious appreciation for the ICT sector’s role in expanding economic opportunity developed.

The advancement in ICT has changed phenomenally and today’s sector is much larger than it was before. Including hardware, software, telephones, support services provided by entities, ranging from corporate players to entrepreneurs to individual developers and networks.

As a result, collaboration has become a key business strategy. Some of the most successful firms have established themselves as “main pillars” within vast “business ecosystems” in which partners, other firms, and even users provide content, applications and services.

ICT increases coefficient of performance, productivity and access to goods, services and markets. The demand for these benefits is high. If the major factors such as power, connectivity, content, support systems and functional market can be put in place, demand for ICT will be correspondingly high. [1]

ICT environment develops local producers, software developers, servicemen and users who can also be the mode of innovation, giving value to the technologies large companies are offering.

Business models in the ICT field are basically of two types : First, they target localities, household and markets for sales of technology and services and can also support the development of local networks in countries that are developing.

ICT fundamentally creates institutional proficiencies. Within companies and government agencies, they help reorganize and speed up administrative procedures, increase the volume and speed of information and permit greater collaboration and sharing of experience.

A number of factors differentiate the ICT sector and its capability to increase. Its products and services enable individuals, firms, government and other players to expand their economic opportunities. Second, ICT companies know well that this dynamic isn’t automatic; rather it depends on a wide range of other factors and players. [1]

## 2. Application of ICT in Business

In the immediate environment many of the devices do not operate in isolation but need to be a part of an information and communication system – linked to other devices with the capability to transfer data between them. We have listed A to Z applications of ICT in our paper which are associated with networks of one kind or another and are closely connected to the global business's point of aspect.

- **Accurate Records: Staff Records, Customer Records**

In Businesses we have to keep accurate records of all of the money coming in and all of the money being paid out. This incorrect information regarding cash flow can have a major effect on things like the company share price - if the profit isn't as good as expected then share prices often drop. It could affect decisions about things such as whether to expand or build new premises i.e. whether to expand our business or not.

- **Biometrics**

Many businesses now use biometrics as a method of allowing access to buildings and information held on computer systems. [7] Governments are beginning to use biometric identifiers in passports, driver's licenses and in the future, a national ID card.

- **Cloud Computing: Internet**

Cloud computing has revolutionized the way businesses manage and pay for technology.[9] Provided in a secure online environment, scalable cloud services give businesses the power to streamline ICT management and costs.

- **Database Management System**

Obviously, this kind of system will cost thousands along with a need to have professional database administrators looking after it and database specialists to create complex queries for management and staff thus keeping ones business ahead of others.[6]

- **E-Commerce: Stock Control**

E-commerce is to purchase and sell goods and services over electronic systems such as the Internet. [7] This can mean businesses selling to customers or businesses selling to other businesses or people selling to other people directly through auction sites such as EBay.

- **Financial Services**

Accounting software records income and expenditure and helps take care of all the cash flow in VAT, tax and PAYE and the requirements of the Charity Commission.[7] Information technologies such as database management in spreadsheets are used to manage project budgets and reports are produced for trustees, managers and funders.

- **Government Online**

To keep pace with fast changing technology and increasing customer expectations, we need to build government's collective capability in online information and service delivery as it is true that business grow in the field where there is more ease for customers.[6]

- **Health Care: medicare, medicine and logistics**

Technology is changing the world around us at a very quick pace. [3] The collaboration with technologies and extensive adoption of social media has ensured the world that healthcare organizations are keeping pace with changes in patient needs. This is a critical time in the global dialogue about "eHealth" and health information technologies. Investing in efficient, accessible and cost effective ICT tools can help to improve health outcomes and prevent diseases in low – resource settings.

- **Improving Communication: Mobile phones, SMS, Fax, Email**

Many technologies in information and communication have made it easier for people to communicate with their organisation, using email, telephone, their website and text messaging. [2] The problem of missing the appointments has been reduced by using text messaging to confirm time and remind clients.

- **Jobs**

Encourage the development of best practices for e-workers and e-employers, built at the national level, on principles of fairness and gender equality, respecting all relevant international norms. [5] Nowadays, people earn their living through ICT by working on blogs and creating website. In promoting teleworking, special attention should be given to strategies promoting job creation and the retention of the skilled work force. ICT has provided many opportunities for employment and promoted early intervention programs in science and technology that should target young girls to increase the number of women in Information and communication technology carriers.

- **Knowlwdge Management**

Everyone should have the necessary skills to benefit fully from the Information Society. Therefore capacity building and ICT literacy are essential. Education is one of the major applications of ICT in which it has evolved drastically.[4] ICTs can contribute to achieving universal education, through delivery of education and training of teachers and offering improved conditions for lifelong learning, encompassing people that are outside the formal education process and improving professional skills.

- **Learning & Creativity**

Technologies are already accepted by the young generation, who are appropriating ICT-tools and in particular web 2.0 applications in new creative ways. [7] New pedagogies have to take into account what it means to be educated in our times, as the overwhelming presence of technologies in our lives brings about a change in the way young people and children learn and understand. Education gives great business opportunities in the aspect of ICT.

- **Marketing: Selling of Ideas**

Internet is one of the ways in which media companies / businesses advertise. [5] The main form is advertisements or 'prompts' on media focused websites. One example is the i-Tunes website, through which millions of people purchase and download music. The site automatically recommends similar CDs / DVDs to the one being purchased by the customer. This is direct marketing, tailor-made for the individual customer. Precise and deliberate programming ensures that the customer is directed potential to further potential purchases. Furthermore, previous customer purchases are recorded, allowing the software to build an accurate customer profile on each I-Tune member.

- **Newsletters**

Newsletters offer advice, information and inspiration for owners, directors and entrepreneurs who are passionate about their business. [2] Each week, experts in the fields of Marketing, Sales, Finance, IT and HR, deliver news, ideas and information, that can help people to drive their business forward. It also covers the issues that are essential for business sustainability and growth. [8] In addition, newsletter also ensures that we are kept fully up to date with any current information that could affect the future of our business.

- **Off the Shelf**

Software is a boon to information and communication technologies. We can classify software according to where it came from. And one of those classes is "Off the shelf". [9] A company produces a piece of software and sells it as a complete product i.e. it is 'off-the-shelf'. Customer cannot ask for any special changes just for them. For example, Office software, CAD software, Accounting software packages are normally 'off-the-shelf'.

- **Production: Automobile manufacturing Industry using Robots**

Manufacturing is a key element of our society. It provides the goods we all like to buy and it employs a huge number of people. [7] Much of this production plant includes ICT elements such as industrial robots, programmable logic controllers, computer networks for coordinating the production process, Input / output devices and a whole array of sensors.

- **QIK: Record and Share video from phone**

ICTs appear ideally suited to the task of enhanced interaction because they can expand communication, cooperation, and ultimately innovation in not only IT sector but many other sectors like agriculture, health, etc.[9] ICTs, especially mobile phones, can and do drive participatory communication, including communication from those on the margins of traditional research-extension processes, and they are often the key instruments that organizations use to deliver services to larger numbers of rural people than they could reach before by recording and sharing videos.

- **Researches: Aerospace research using super computer**

Launch pilot projects to design new forms of ICT-based networking, linking education, training and research institutions between and among developed and developing countries and countries with economies in transition. [3] Not only the researches in Aerospace sector but also in sectors like weather forecasting, have made researches as one of the most important application of ICT from business point of view.

- **Security: Barcodes, CCTVs**

ICT Security recognizes the need for protecting data both while in rest and as an accurate and legal grade representation of evidence. [8] Whether it is document or data, digital time-stamping allows organizations to provide a legal grade signature and audit trail of the contents of documents, log files and critical information used within the organization or with its partners. ICT Security has a range of solutions that assist organizations with physical and electronic aspects of data and document with the use of barcodes and CCTVs.

- **Travel and Tourism**

The Internet has dramatically changed the way consumers plan and buy their holidays. [6] Information and communication technologies have brought a boom in the transport and travel area. It has also affected how tourism providers design, shape, promote and sell their products and services. The tourism market relies heavily on information. Since the emergence of the Internet, travel information search and booking has been one of the top 5 most popular on-line tasks.

- **USB: Universal Serial Bus**

Universal Serial Bus (USB) is a type of connector that links devices. It is mostly used on PCs using ICT but can also be used on other devices such as the PlayStation, and the Xbox. [5] USB can be used as a power device for charging things and making use of gadgets like lights and fans. In today's scenario most people use USB for mice, keyboards, scanners, printers, digital cameras, and flash drives, thus contributing maximum towards the business in hardware.

- **Video/Audio Calls: Conference calls, VOIP (Voice Over Internet Protocols) eg. SKYPE**

Teleconferencing allows people in different locations to talk to each other as a group. This is also known as an Audio-conference or simply a 'Conference Call'. [7] Video conferencing nowadays is of great utilization in conducting meetings worldwide. Video conferencing is similar to teleconferencing except that people in the meeting can now see one another because video cameras are used to send live images over telephone lines.

- **WWW: World Wide Web**

The WWW appears to be an ideal ICT medium for businesses attempting to promote themselves and their wares. [3] Setting up a site on the WWW, and thus gaining instant access to millions of people all over the globe, can be achieved at a small fraction of the cost using more conventional methods.

- **Xcode**

Xcode is an integrated development environment (IDE) containing a suite of software development tools developed by Apple for developing software for OS X and iOS. [9] While, we all ogle the evolution of Apple's iOS 7, let's not forget to become familiar with the latest iteration of Xcode. Without Xcode 5, it will not be possible to develop apps for the latest iOS. Xcode 5 is currently available in a beta release to all registered Apple developers. Apple is one of the best companies using the information and communication technology with its great innovation and efficiency.

- **Youtube**

YouTube being the largest video sharing website now has millions of clips available, classified into many specialist channels. [3][5] Many people use YouTube just for entertainment but the site also contains a huge amount of learning material, as companies and individuals upload tutorials on their products or specialist topic. Google, who own the site, has also made it easy for other web sites to embed YouTube videos into their pages and build up more business. With the massive success of the site, there are now many other video sharing sites those cover more specialist topics which is bringing boom in the electronic business.

- **Zip**

To 'zip' a file. [9] This means to compress a data file by using the zip algorithm. Compression is often quite good on spreadsheet and document files - 70% is often achieved which has made a storage memory very cost effective at the time of keeping big database. A very popular zip utility is called 'WinZip' and modern operating system can also handle zipped files without an extra utility.

### 3. Conclusion

A number of factors differentiate the ICT sector and its capability to increase. Its products and services enable individuals, firms, governments, and other players to expand their economic opportunities. ICT companies know well that this dynamic isn't automatic, but rather depends on a wide range of other factors and players. ICT Applications are majorly emerging in areas of education, finance, entertainment, public services and research, building up great business opportunities.

### 4. Acknowledgment

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## Winning the Race: Trends and Dimensions of Business & Management

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### **Abstract:**

*Against the backdrop of uncertain and complex business environment this paper aims to explore some recent trends in Business Management to understand them better. Discussing the current picture of Business Management paper aims to highlight recent and most popular trends in various walks of Business Management. This paper will discuss some recent trends in Business Management and also that how they are affecting the traditional approaches. Limitation of this paper could be its limited scope, mainly the region, and time, and superficial discussion of some of the trends.*

**Key words:** Trends, Business and Management, Trends in Finance, Trends in Marketing, Trends in Human Resource

### **1. Background**

In today's globalized world each and every organization is expected to compete internationally to survive and grow. To retain their competitiveness and to align their business to ever changing environment businesses sought to new and innovative ideas which in long run become a trend if successful. Effective Management equipped with advanced technology and aided with innovations is a key success for any business. Both, management and technology are pillars of success, not just for business and organizations, but also for government, public sector, non-profit, and others. Market player in the industry keep doing SWOT analysis to identify risks and threats to their business and they try to capitalize on the opportunities presented by continuously evolving environment by setting new trends. These trends are need of an hour and they do dictate future of business. The purpose of this paper is to identify and analyze a few recent trends in business which if adopted and implemented properly and at right time can add to the pace of success of business.

### **2. Research Methodology**

This research study is exploratory in nature. The purpose is to gain familiarity with a phenomenon or to achieve new insights about the area of study. The exploratory research design has been adopted to explore the recent trends in various areas of business. The data was collected through Primary sources and was supplemented by secondary data as well. Samples for the study were drawn from management educators and researchers. Data have been collected through personal interviews and a few brainstorming sessions of 50 management educators and researchers of Bhopal region. Secondary data has been collected through articles, journals, books etc. Purpose of the study is to investigate recent trends in business which can be used as baseline for business and research. Data collected was analyzed through descriptive statistics using SPSS.

### **3. Result & Discussion**

For success of any business major trends that are reshaping the economy and transforming the behavior of stakeholders, namely, consumer, competitors, suppliers and regulators etc. needs to be considered and acted upon. The challenge for any business is how to anticipate and adapt to uncertainty, rather than simply react to events. In the light of these thoughts the unstructured interviews were conducted and the data so obtained after supplementing with secondary data are classified as under:

#### *3.1. Trends In General Business*

##### 3.1.1. Glocalization

In the era of globalization to outperform competition business needs produce product or service which are specifically adaptable to each locality or culture in which it is sold. Glocalization is the blend of globalization and localization. It refers to a concept to describe product or service that reflects not only global standard but also local ones.

### 3.1.2. Information Technology

As per Business Week's annual list of top five most innovative companies four are into technology driven business. To be in business and to fight competition business have to be technology savvy, as IT is a great facilitator. You can get information from any part of world within seconds; you can connect to suppliers, customers via websites, social media, emails etc in no time; orders can be tracked in real time; and what not.

### 3.1.3. Sustainable Development

Sustainability is an extension to CSR. For business to be sustainable first our planet has to be sustainable. Businesses are focusing on minimizing carbon footprints; they are forming Green Teams consisting of self motivated people who work towards environmental sustainability.

### 3.1.4. Emphasis On Psychology

Extensive research is being done these days in the fields of psychology such as cognition, motivation, behavior and performance. From customer satisfaction to employee management and retention business regularly requires effective analysis of both individual and institutional psychology.

## *3.2. Trends in Marketing*

### 3.2.1. Simplicity

Our lives are complex, we have very little time to spare, it is not possible to continue at this pace. Researchers predict that 2013 is likely to be driven by SIMPLICITY. Be it marketing strategies or nature of product and services the successful ones will be that simplify the consumer's life or experience. Ease of use will gain importance.

### 3.2.2. Mobile Marketing

After internet marketing it time now for Mobile Marketing. In last one year Smartphone market has surprising grown to 100 crores across the world, which means every 6th person has a Smartphone. In parallel, telecommunication companies are constantly in a race discounting 3G data access charges, which will make consumer habitual to online consumption on the mobile. This is a big opportunity for marketers to be explored and open up future revenue streams. Mobile marketing has several facet i.e., SMS Marketing, M-Couponing etc. This service may also be used to serve customers in a better way in addition to marketing products.

### 3.2.3. Social Media Marketing

IT has become the buzzword and Social Media is being used for all causes be it social, be it charity, be it networking, or be it marketing. No business can remain in competition without the use of social media. These days social media, viz. Social Networking Website, e-mail Domains, Search Engines etc. are being used to promote products and services and also to attract traffic, attention and hits to respective websites.

## *3.3. Trends in HR*

### 3.3.1. Standardization of HR

Companies can no longer afford different HR policies in different regions. They will need to adapt their global strategies for local markets as well. Participation of local staff in decision-making and leadership needs to be encouraged. The companies where information and authority flows in all direction are the need of the day.

### 3.3.2. Emphasis on Retention

In this dynamic environment retention of good workforce is a major issue. A great raise can raise morale, but GREAT is defined differently by different people. So, companies are coming up with new perks for retaining employees' ranging from opportunity for professional growth, training and development, healthcare, extra vacation, flexible work hours, comfortable dress etc.

### 3.3.3. Green Teams

Many forward-looking organizations take conscious efforts for establishing and maintaining good environmental management. This is achieved through the commitment of senior managers and their leadership and of course through team work. The teams consciously working for the environmental sustainability are termed as 'GREEN TEAMS'. Green teams are groups of employees helping to identify and implement specific improvements to help their business operate in a more environment friendly sustainable manner.

## *3.4. Trends in Finance*

### 3.4.1. Micro financing

Micro lending or Micro financing has its root in promoting women entrepreneurship in underdeveloped countries to start their small business ventures. But with the Rupee value on such a swing, the popularity of microfinance has extended to the other areas as well because aspiring entrepreneurs are starting ventures with less capital.

#### 3.4.2. Public-Private Partnership

P3 in India as per Wikipedia is “a partnership between a public sector entity (sponsoring authority) and a private sector entity (a legal entity in which 51% or more of equity is with the private partner/s) for the creation and/or management of infrastructure for public purpose for a specified period of time (concession period) on commercial terms and in which the private partner has been procured through a transparent and open procurement system.”

#### 3.4.3. Financial Inclusion

Inclusive Financing or Financial Inclusion means ensuring availability of financial services to the disadvantaged weaker sections of nations at affordable cost.

### **4. Conclusion**

Organizations are constantly in a race of the business and management. Some companies understand that and run well; some don't. If your business is constantly struggling to keep pace with unexpected situations and events you are ones who don't understand that its a race. It will always push you on the back foot competitively and risks of losing out would always be there. Businesses which understand this race always strive for innovations and regular reinvention and they quickly capitalize upon emerging opportunities by setting new trends or giving new dimensions to the environment.

This paper discussed what generally is happening in various functions of business and management and highlights the importance of adopting trends. Interestingly, it was found that how all recent trends are more or less related to each other, like Green Teams enhance retention. With the sole aim of cost cutting, making the process more efficient and faster and reducing efforts and waste all these trends give competitive advantage to the business & management.

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## Understanding Financial Inclusion in India and Role of ICT in ICT

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### Abstract:

*Inclusive growth is absolutely necessary to pull millions of Indians out of poverty. Financial inclusion is crucial driver for such growth by covering large sections of society providing them with financial services. High economic growth in the past decade has led to huge economic inequality in India; various efforts have been made to achieve the objectives of the financial inclusion. One such effort is adoption of ICT in Indian banking sector. This paper is an attempt to understand how the financial inclusion is happening in India by discussing and analyzing various initiatives by the Government, Reserve Bank of India, Banks and the role played by ICT.*

**Key words:** Financial inclusion; ICT; Financial services; Inclusive Growth; Indian banks

### 1. Introduction

India which was a socialist economy at the time of independence did away with the socialist policies after the economic liberalization in 1991 and by the turn of 21st century, India's GDP has grown at a very high rate peaking at 10.1 percent in 2010. This level of economic growth has led to huge economic inequality, to negate this inequality it was understood that inclusive growth is necessary. Inclusive growth can be possible only through financial inclusion. The term financial inclusion can be defined as deliver of financial services at affordable costs to sections of disadvantaged and low income groups. Although the term gained importance in early 2000's, the beginning of financial inclusion in India can be traced back to 1969 when Indira Gandhi, the then Prime Minister of India nationalized fourteen major commercial banks and in 1980 another six banks. This brought 91 percent of banking sector under government [1]. After the nationalization, Indian banking sector expanded in an unprecedented rate. Since 1969 the banking sector has grown at a good pace, over 102,343 branches have been opened compared to 8700 before 1969, thus providing more number of people with access to the financial system [2]. Still, Only 58.7 percent of the Indian population are availing banking services with the formal financial sector [2] and only 40 percent of population are engaged with the formal financial sector [3]. As the level of financial exclusion in India is alarming, to increase the financial inclusion various initiatives and policy measures in banking sector have been taken by the Government and Reserve Bank of India to accelerate the process. For a developing economy like India, financial inclusion helps to improve the social development initiatives by reducing the leakages in social welfare distribution programs.

### 2. Barriers to Financial Inclusion

The term "excluded section" refers to people who are not having access to the financial services. Excluded section generally consists of people working in an unorganized sector, landless labour, migrants, urban slum dwellers, marginal farmers, socially excluded groups. The major barriers for financial inclusions are due to lack of information and awareness people from excluded section find the financial services complex in nature. Since the commercial banks operate in profitable areas as a result only 37 percent of branches are there in rural areas whereas almost 70 percent of India is in rural areas [2]. People who live in under developed areas find it very difficult to reach the nearest bank due to transportation cost and wages lost in travelling to the bank. Another barrier for financial inclusion is insufficient documentation, inability to provide a legal identity such a residence proof, birth certificates, etc. often exclude women and migrants from accessing financial services.

Other barriers are limitations of physical infrastructure, high cost of maintaining setup.

### 3. ICT and Financial Inclusion

Developments in the field of Information and Communication Technology (ICT) have made inroads in almost all the sectors. The impact of technology adoption particularly in the banking sector has changed the face of the industry. Banking sector is the backbone of any economy and a healthy economy denotes a strong and resilient banking sector. ICT strongly supported the growth and

inclusiveness of the banking sector, thus facilitating an inclusive economic growth. ICT not only improved the efficiency of the banking by strengthening the back end administrative processes and also front end operations thus bringing down the transaction costs for customers which has been the major focus of the ICT for financial inclusion. Today banks have centralized operations, more and more banks and branches are moving to core banking solutions, network based computing and are using ICT for customer relationship management.. The average cost per transaction through an ATM is INR 18 whereas the same for a bank branch is INR 45 [4]. ICT has not just helped to reduce the transaction costs but it is acting as a tool to facilitate financial inclusion overcoming the barriers such as limitations of physical infrastructure and high cost of maintaining setup. Various initiatives taken by the banks use ICT as an important tool for fulfilling them. The Business Correspondent (BC) model which is the most successful model adopted by the Banks for financial inclusion would not have been possible without ICT.

#### **4. Initiatives Taken By the Government of India, RBI and Banks to Facilitate Financial Inclusion**

The Government of India and the Reserve Bank of India have played an important role in establishing banks and financial infrastructure for providing financial access to the poor such as National Bank for Agriculture and Rural Development (NABARD) and Small Industries Development Bank of India (SIDBI). NABARD has designed and developed the SHG-Bank Linkage Programme (SBLP) through which it has provided INR 25.45 billion to banks covering their lending to SHGs and around 4.82 million SHGs received loans from banks with an outstanding amount of INR 306.27 billion while 7.54 million SHGs have been linked to the banking system as on March 2011[5]. Although the number of SHG's linked with banks have increased, but the size of the disbursed loans haven't shown the same trend and in fact the SBLP had underperformed in the year 2011-2012[5]. It also operates the INR 500 crore Women SHG's Development Fund proposed by the Union Cabinet 2011-2012 to empower women and fund their SHG's[5]. Other overall inclusion initiatives by the Government are Swarnjayanti Gram Swarozgar Yojana (SGSY), National Rural Livelihood Mission (NRLM) , The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and Aadhaar. The measures taken by the RBI include No-Frills Accounts (NFA), relaxing Know Your Customer (KYC) norms, providing easy credit facilities through Kisan Credit Card (KCC) and General Credit Card (GCC), liberalization of Bank branch expansion. Through NFA with a view to achieving the objective of greater financial inclusion, RBI advised all the banks to provide basic banking account either with 'nil' or very low minimum balances as well as charges that would make such accounts accessible to vast sections of population. In doing so, the RBI has asked the banks to relax the KYC norms. Hence, KYC procedure for opening accounts was simplified for those accounts whose balances will not be exceeding INR 50,000 and their annual borrowing would not exceed INR 100,000[6]. A study by CMF-IFMR in their findings published that 72% of the accounts in Cuddalore, Tamil Nadu had zero or near zero balance even after a year. Similarly, another CMF-IFMR study reported that the 100% inclusion drive in Gulbarga district, Karnataka did not have any major impacts because as much as one-third of the households were without bank accounts even after the drive[5]. With the view of providing credit facilities in the rural areas, RBI advised all the Scheduled Caste Banks (SCB's) and Regional Rural banks (RRBs) to introduce GCC facility up to INR 25,000, for their constituents in rural and semi-urban areas [6]. Similarly, the RBI also introduced the KCC scheme to provide timely credit to the farmers for the agricultural purposes. 22.49 millions Farmers have been provided with Kisan Credit Cards and 950,000 clients have been provided with General purpose Credit Cards as on March 2011[5]. RBI has also advised the banks to use the services of NGOs/SHGs/MFIs by providing banking services as BC's. RBI in its October 2009 review took a further step in financial inclusion by freeing the norms for opening of branches in towns or villages with population less than 50,000. The Financial Inclusion Technology Fund (FITF) had been set up in 2007-08 as per the suggestion of the Rangarajan Committee report with a corpus of Rs. 500 crore each. The objectives of FITF has been to enhance investment in ICT aimed at promoting financial inclusion, stimulate the transfer of research and technology in financial inclusion, increase the technological absorption capacity of financial service providers/users and encourage an environment of innovation and cooperation among the stakeholders[6].

#### **5. Business Correspondent Model (BC) Model**

To achieve higher financial inclusion in the country, a committee on Financial Inclusion, with Dr. C. Rangarajan as Chairman, was constituted by the Government of India in June 2006 to increase the outreach of the banks for greater financial inclusion. The committee recommended the banks to use the services of intermediaries such as of Business Facilitators (BFs) and Business Correspondents (BCs) for providing financial and banking services to the people in rural and unbanked areas. To enable themselves in expanding their outreach and offer limited range of banking services at low cost at locations other than where there is a bank branch/ATM, banks engage retail agents. These retail agents are Business Correspondents (BC) who represent the concerned bank and offer financial services. These BCA's are connected to the bank by CBS and the transactions are done in such a way that as on swiping the smart card on the smart card on the machine the account details of the customer are retrieved and then once the amount to be transacted is entered the transaction is authenticated by biometric system present in the machine, which scans the customers thumb print, since most of the customers are illiterate, there is a voice system present in the machine which announces the transaction details to the customer in the local language, hence this so designed to ensure that customer is not cheated . As of December 2012, there were over 1, 52,000 BCs engaged by Banks [2]. Also till December 2012, over 18.38 crore transactions valued at INR 16533 crore had been undertaken by BCs [2]. BC's have also brought down the transaction costs which have also been one of the major objective of financial inclusion. According to a Wharton School study, the average cost per transaction in India at a BC is the lowest at INR 4.50 per transaction as compared to an ATM (INR 18) and a bank branch (about INR 45) [4]. Also, under the "Swabhimaan" campaign launched in February 2011, over 74,000 habitations having population in excess of 2000 using various models and technologies

including branchless banking through Business Correspondents(BCs)[2]. Earlier we have seen that no frill accounts (NFA) approach of financial inclusion has proven to be ineffectual, but what actually is to be thought of is NFA when delivered through BC's have also shown very low activity. One reason for this is because current model of BC offers only liquidity management. While a transaction mechanism for daily cash management is indeed a core requirement for low income customers. However, the particular segment views this as more complex and hence customers prefer storing money with themselves as they see it as less complex and more convenient. The other reason is among the banks, the financial inclusion is often views as regulatory compulsion or social initiative rather than viable business proposition. As a result mass accounts opening and recruitment of BC's is being done and minimal focus is put on implementing an effective transactional mechanism. According to the Micro save survey, there is a belief among bankers at all levels from senior managers to branch staff that the business correspondent model is a poor man's service [7]. This attitude is turning the lack of belief in the business case into a self fulfilling prophecy, as evidenced by the paltry levels of activity in most BC initiatives. Dr. Duvvuri Subbarao, the then Governor of RBI said it is only the change in mindset of all concerned stakeholders that can make financial inclusion a reality' Bankers should, therefore, change their mindsets, view financial inclusion as a viable business proposition and adopt innovative methods and low-cost delivery models to reach out to the poor. They should study the different markets across India thoroughly and offer region-wise customized products and services riding on the higher levels of trust enjoyed by them over the other financial service providers in rural India [8]. Also, Dr. K.C. Chakrabarty, Deputy Governor of RBI in his address at 7th Banking Tech Summit 2012, Mumbai on 28 June 2012 said "Banks have to ensure that the BC model finds space in the business strategies of the banks and not in the footnotes of their annual reports and that the banks should make client acquisition under this model a business proposition; and not treat it as a CSR activity"[9].

## 6. Mobile Banking

The term mobile banking consists of activities that result in an entity's access to the range of banking products (related to savings or credit) by using a cell phone. This also includes payments (transfer of value, bill payments etc.) made using a cellular/mobile phone. The mobile banking provision for the unbanked population can be the quickest way to achieve the goal of financial inclusion in India. On customer's side, it can help them to easily avail the financial services at a low cost. On banks side, mobile banking will be cost effective (would save costs of providing physical access). Thus, mobile banking can successfully tackle barriers of financial inclusion which are high cost of providing services and low accessibility. The outreach of the banks would increase tremendously by providing services through mobile banking. Total mobile subscribers as on March, 2013 are 867.80 million[10] and according to the Analysis Mason report there will be more than 1.36 billion mobile subscribers[11]. Also, according to TRAI (Telecom Regulatory Authority of India) the rural India will cross 100 percent mobile penetration in 2020[12]. There are various communication modes for deploying mobile banking services such as Interactive Voice Response (IVR), Short Messaging Service (SMS), Wireless Access Protocol (WAP), Stand-alone Mobile Application Clients (Mobile Apps), Unstructured Supplementary Service Data (USSD), Using SIM tool Kit (STK). The target groups for the financial inclusion are likely to be low income, semi literate with limited knowledge of technological applications. Hence, such target groups would prefer a mode for mobile banking which is user friendly (menu driven but without the need to download software etc.), has a low cost of operation (cost per transaction) and does not require any significant investment (requirement of a high-end phone instrument).

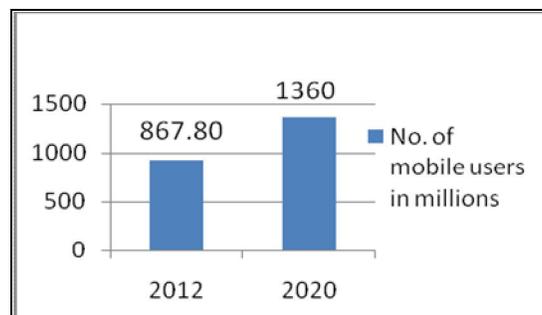


Figure 1

Sources: TRAI; Analysis Mason

The features of IVR, SMS and USSD make them eminently suitable communication modes for providing banking services for financial inclusion. Banks have deployed the IVR channel for services like balance enquiry, mini-statement, cheque-book request and complaint booking and not for the full-suite of mobile banking services, as the human interface in IVR exposes the system to the potential risk of misuse and the cost of operation is also high. However, SMS and USSD have been deployed for a wider range of services by most banks that have implemented mobile banking services. Some banks such as SBI and ICICI have launched USSD based services. However, there are various challenges with adoption of mobile banking are Regulatory challenges such as only those having banking account can use the provision of mobile banking. This will limit the full potential of mobile banking to extend micro credit and bring banking to the large number of unbanked customers. India has 18 official languages and state governments are directed to correspond in their official language for official purposes and as there is huge illiterate Indian population; pan Indian mobile banking will be quite cumbersome. Also, there are other security challenges such as SMS spoofing attack, where attacker

sends the messages on network manipulating sender's number. Virus attack where software's like Trojan Horses and Zeus are used to steal mobile transaction authentication number or password.

## 7. Conclusion

Significant progress towards financial inclusion has been made through various initiatives taken by the Government, RBI, Banks and ICT has been the key driver in implementing these initiatives. Various models have been tested for financial inclusion, however BC model has emerged out to be the most effective model for the financial inclusion so far and has managed to reduce the transaction costs and tackle the barriers of financial inclusion. It is important that banks should start addressing the issue of financial illiteracy by organizing campaigns, addressing this issue would help in greatly reducing the financial exclusion. Banks rather than just offering liquidity management services should also offer other innovative products which would have customer value proposition. Banks should see financial inclusion as an opportunity rather than just a regulatory compulsion or a social initiative because today's poor is tomorrow's middle class. It is for the banks to convert what they see as an obligation into an exciting opportunity and aggressively pursue it. Banks should create out of box strategies and employ new technologies to enhance the performance of the existing approach. Another model which will immensely help in financial inclusion is mobile banking which is still in its nascent stage. With an expected rural penetration of 100 percent by 2020, mobile banking along with an innovated BC model will give magnanimous outreach to the banks and also help them in providing cost effective products and services. Hence, ICT has a greater role to play in financial inclusion.

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## Organizational Identification in Executives Of A Steel Company in Central India

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### Abstract:

Organizational identification is a psychological construct that links the employees with their organization when they identify with beliefs, values and principles practiced by the organization. The construct Organizational identification is gaining importance in organizations to predict employee behavior and intentions. Through this paper a study of organizational identification of executives of a steel company in central India has been presented. The study was conducted across three variables-age, designation of executives and their experience in the current organization. A brief literature review on organizational identification has also been presented.

**Key words:** Organizational identification, Positive identification, Neutral identification, Ambivalent identification, Disidentification

### 1. Introduction

Organizational identification (OID) is a key concept that helps in understanding, explaining and predicting employees' work related attitudes and behaviors in organizations. Current Business environment demands work force which is motivated, efficient and works for the benefit of the organization. For an Organization's well being, it is necessary that the employees identify with the Organization. An employee is more likely to identify oneself with the organization if it provides opportunities for meaningful self definition and self development. A person will identify him or herself with an organization only if the identification is relevant for a person's self-interest. Organizational identification is likely to exist when an employee finds his membership relevant, fulfills personal motivations and thus satisfies himself in doing so.

### 2.Literature Review

OID is a psychological construct that links the employees with the organization they work for. Employees identify with the organization when the beliefs, values and principles espoused and practiced by the organization become self-referential or self-defining and become an integral part of their self- identity [12][17]. OID involves self-categorizing oneself as a member of the organization in order to define one's self concept and thereby achieve and maintain one's self-esteem [6].

High degree of OID among employees is the most desirable and healthy state for any organizations. The cognitive attachment with organizations leads to emotional attachment in the form of sense of belongingness and commitment which further lead to behaviors in the form of citizenship behavior [16]. Employees with high OID show low turnover intentions[1] [15], show high job satisfaction and well being [19]; develop positive attitude towards supervision, pay, promotion, and co-worker, show high task involvement and invest more effort in job performance [4]; show high customer orientation [20]. Leaders' OID influences followers' OID and increases followers' job satisfaction and their willingness to exert extra effort on behalf of organization [16]. OID is shown to facilitate suggestion making behavior for organizational improvement [8] [14] and increase organizational learning activities [18].

If OID leads to such favorable consequences then the understanding of the antecedence of OID will help management to improve organizational efficiency by creating conditions that foster high degree of OID among its employees. Researchers have identified individual, group and organizational variables influencing OID. Personal alienation is found to decrease OID by decreasing need deprivation, job satisfaction and job involvement [3]. Interest for outdoor work, dependable and non-delinquent life style, preference for group attachment, and involvement in intellectual pastime are found to increase OID [10]. Need for group affiliation and work based social support produce stronger OID among virtual workers [21]. Team diversity is found to increase OID when differences among team members are congruent with norms and expectation of the organization [13]. Hot-desking is found to impact work group

identification [11]. Organizational prestige and construed external image show positive relationship with OID[9]. Perceived social responsibility and organizations diversity climate [5] are shown to affect OID.

Organizational identification is an expression of one's congruence between the individuals' self definition and being a member of the organization [10]. However, organizational identification was defined as "the process by which the goals of the organization and those of the individual become increasingly integrated and congruent". In the organizational context, identification is related to similarities in beliefs of members towards the meaning and values espoused by the organization. The more the employee identifies him or herself with the organization, the more likely the employee makes decisions that are consistent with organizational objectives. When they identify strongly with the organization, the employees define the organization in terms of how they would define themselves [2]. A member's organizational identification has significance in terms of whether an organization's members will be inclined to act in the best interests of the organization [21].

### 3. Research Objective

To study the level of Organizational identification in the executives of a steel company based on their demographic variables such as age, experience in the organization and designation.

### 4. Research Methodology

#### 4.1. Variables under Study

- Organizational identification
- Age
- Designation
- Experience

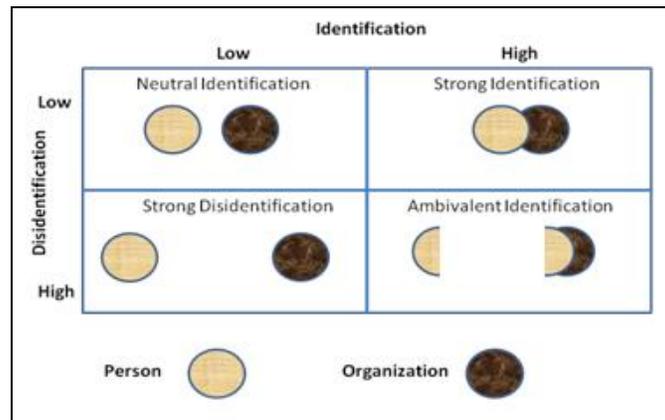


Figure 1: Organizational Identification

When there is a positive value fit between the employee and organization then it results in Positive identification (POID).

Ambivalent identification (AOID) arises when the value fit is not total but fragmented, certain aspects fit and certain other do not and as a result the employee partially identifies with the organization.

Neutral identification (NOID) results when the values do not fit but employee is indifferent about the mismatch and for various reasons wants to continue the membership with the organization.

When work values of the employee do not fit and are totally opposite to that of the organization and the employee is highly concerned about the mismatch, then it results in Disidentification (DOID).

#### 4.2. Sample

A sample of 69 permanent male employees from a steel company was taken for the study. Stratified Random Sampling method was used to collect the sample.

The percentage of senior level managers was 31.9%, middle level managers 24.6% whereas junior level managers 43.5%.

The sample consisted of 42% respondents having age less than 40 whereas the remaining 58% were above 40 years of age.

27.5% respondents had more than 20 years experience in the organization, 18.8% had 10 to 20 years of experience while the remaining 53.6% had less than 10 years of experience.

#### 4.3. Instrument

Organizational Identification Questionnaire [7] was used to assess Organizational Identification (OID). The questionnaire was administered in a classroom setup with formal introduction of research to three groups. The questionnaire along with questions on demographic details and instructions on how to fill the questionnaires was distributed to the sample during office hours after obtaining necessary permission from the authorities. Respondents were told about the general purpose of the research. Respondents were

assured of confidentiality of the responses. Mentioning of name was made optional. Response to this instrument was collected on a 6-point Scale, ranging from 1 (not at all) to 6 (always).

**5. Data Analysis**

Data collected through the questionnaires was analyzed with the help of a statistical software SPSS. The Z-scores for the data were calculated and graphs were plotted for the same. Two groups were considered according to age. One group was with age less than 40 years and the other with age more than 40 years. As per the designation, the sample was divided into three groups. First group constituted of senior level executives, second group was that of middle level executives and the third group was of junior level executives. Experience in current organization was another variable under study. The sample was categorized into three categories. One with experience less than 10 years, second group with experience between 10 and 20 years and the third group with experience more than 20 years in the steel company.

**6. Findings**

*6.1. Organizational Identification According To Age*

The executives in the age group of less than 40 years showed ambivalent identification and not Positive identification while the other group with age more than 40 years showed Positive identification with the organization.

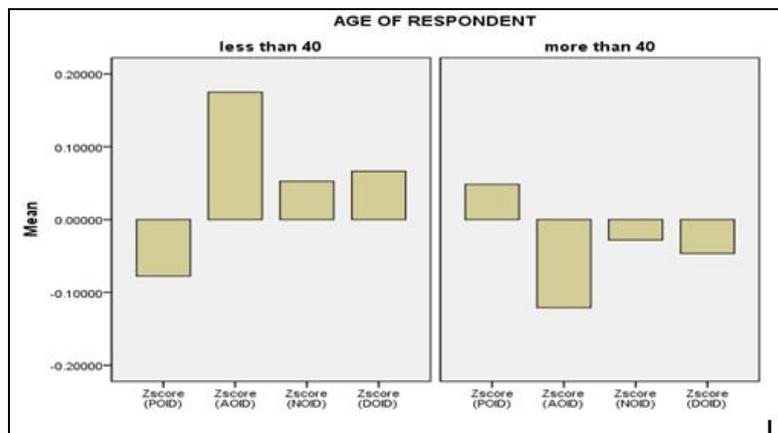


Figure 2: Organizational Identification Age Wise

*6.2. Organizational Identification According To Designation*

- Senior level executives showed positive identification.
- Some of the middle level executives showed Neutral identification whereas some even showed Disidentification whereas they did not show Positive identification.
- Junior level executives showed ambivalent identification and did not at all show Positive identification.

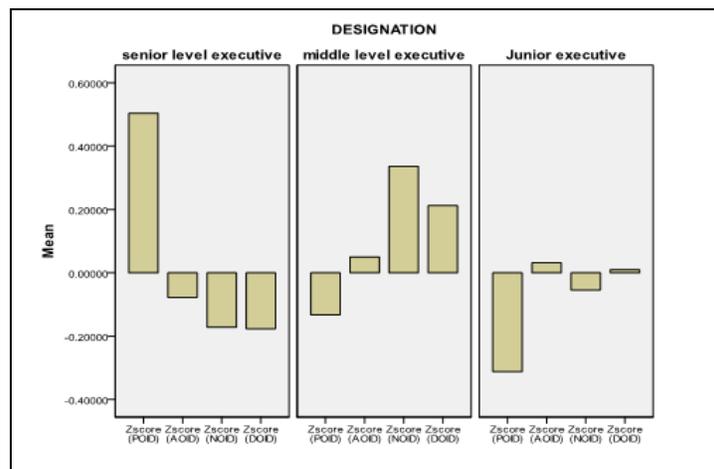


Figure 3: Organizational Identification According To Designation

*6.3. Organizational Identification According To Experience*

- Executives with more than 20 years of experience showed ambivalent identification and to a certain degree even Disidentification whereas they did not show much Positive identification.
- Executives with 10-20 years of experience showed Neutral identification but not Disidentification.
- Executives with less than 10 years of experience did not show any form of identification. There is no clarity of identification built in this group of executives.

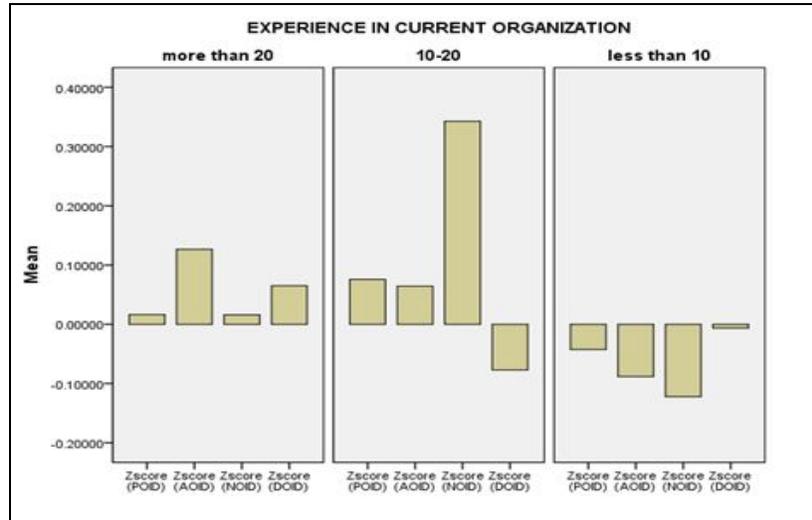


Figure 4: Organizational Identification According To Experience

7. Summary of Results

ORGANISATIONAL IDENTIFICATION	POID	NOID	AOID	DOID
AGE	>40		<40	<40
DESIGNATION	SENIOR	MIDDLE		JUNIOR
EXPERIENCE		10 - 20 YEARS	>20	<10

Table 1: Organizational Identification

8. Conclusion

Senior level executives with experience more than 20 years reflected Positive Identification. Middle level executives with experience 10-20 years showed Neutral identification. Junior level executives with experience less than 10 years showed Disidentification.

9. Limitation

The sample was taken only from one plant of the company.

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## Performance of Monthly Income Plans in Indian Industry

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### 1. Introduction

Mutual fund is one of the financial investment in the market, main theme of the study for the performance of monthly income plan in Indian Mutual Fund Industry to invest the investment in the field and return high profit with low risk in every monthly income. Mutual fund is based on the investor to invest the one time amount deposited and getting the monthly income especially for the all and mostly for the senior citizens. They have to live with freely and without hindrance.

The mutual funds monthly income plan in India over a period of time at present most of them to invest the one time amount and get a monthly income.

Various schemes of mutual funds in monthly income plan

Net Asset Value of Mutual funds

SEBI (Mutual Fund in monthly income plan) Regulations.

The Mutual Fund in India began in 1964 with the establishment of Unit Trust of India (UTI), also the mutual fund in monthly income plans which continues market today also. The mutual funds have to lead as one of the important of financial field, which needs of retail investors opportunities.

#### 1.1. The Advantages of Investing In a Mutual Fund Are

- Professional Management
- Diversification
- Convenient Administration
- Return Potential
- Low Costs
- Liquidity
- Transparency

#### 1.2. Investments in Mutual Funds

Mutual Fund firms collect cash from willing investors and invest it in share market. The stock market, mutual fund investment are also entitled for various market risks but with a fair share of profits.

The mutual fund schemes based on all or some of the following condition: Long term and Short Term Performance Consistency in Returns Performance during bullish and bearish phases Fund Managers performance with the fund's operations

The above points are clarity, securitization deals are best to the pre-tax claims period. The Budget has provided to exempt securitization Trusts from taxes.

The cost advantage that mutual funds offered to investors has been slightly reduced to "revive" the fortunes of the industry. The Securities and Exchange Board of India (SEBI) recently changed rules to encourage the mutual fund industry to increase its reach beyond the large cities. The result is a slightly higher cost for investors.

The Mutual Fund is one of the financial instruments in capital market, here the study based on the empirical investigation on the performance of monthly income scheme in Indian Mutual Fund Industry, main purpose of the study is to identify which of the month income scheme provided highest return and minimize the risk. Research need because of the capital market is unexpected volatility and some time reaction was positive and negative.

### 2. Problem Identification

“Performance of Monthly Income Schemes in Indian Mutual Fund Industry in India.”

The tools for analysis of performance of mutual fund its' included Price Earnings Ratio, Book Price Ratio, Return and Net Asset value and Assets

### 3. Review of Literature

To collect points from review of existing literature.

- Treynor, Jeck L. (1965), —How to Rate the Management of Investment Funds, Harvard Business Review, NAV 2007 Mutual Fund, Insight, volume V, number 2, value research in this journal sanjeev pandiya has evaluate the market and needs of mutual funds. Sanjeev mentioned highlight market capitalization of Mutual Fund.
- Reliance Mutual Fund, Reliance Capital Assets Management Ltd. Annual Report for the AMC of Reliance Mutual Funds. Reliance Mutual fund schemes performance mentioned on offer documents. Offer document indicates detail information of particular fund with past performance.
- BalaRamasamy, Matthew C.H., have examined the growth in terms of size and choice, in the Mutual Funds industry among emerging markets has been impressive. The papers give you an idea about future market of Mutual Fund, Also highlight tax benefit received to invest in Mutual Fund.
- Accounting & Finance; Publisher of Tata Mcgraw Hill &Mcgraw Hill, How to calculated the beta and Price Earning Ratio. The Fund Performance also communicated return inform of Price Earnings Ratio and Price Book Ratio.
- Fuller R.J. and Farrell J.L. jr, (1987), Modern Investments and Security Analysis, Singapore: McGraw Hill Book Co.: the paper explained the modern investment management, how much pororation of the Mutual fund on portfolio compare with the scrip investment.

### 4. Research Design

The research design is the framework study is conducted and it construct for collection of data, measurement of data, statistical tools for analysis and analysis of variance.

Researcher decided proper plan to action and define variable. Variable also identified dependent and independent.

Researcher specified research processing and analyzing of the data.

### 5. Title of the Problem

“Performance Of Monthly Income Scheme In Indian Mutual Fund Industry In India”.

The schemes of the mutual funds included equity funds, balance funds, index funds, monthly income funds, long – term, short term, technology, fast moving consumer goods, real estate's.

### 6. Objectives of the Study

The objectives of the study for:

- To evaluate the growth of mutual funds in monthly income plans in Indian Industry
- To examine the high return and low risk from selected MF
- To evaluate the overall performance of mutual funds in monthly income plan

### 7. Sampling Design

- Universe:
- Sampling Unit:
- Sources List:
- Sample Period:

Sample study collect from January 2011 to till now.

Sample Size:

- The list of top 10 performing mutual fund companies is as follow:
- HDFC Mutual Fund
- Tata Mutual Fund
- SBI Mutual Fund
- Reliance Mutual Fund
- DSP Blackrock Mutual Fund
- Kotak Mutual Fund
- Principal Mutual Fund
- Sundaram BNP Paribas Mutual Fund
- Franklin Templeton Mutual Fund
- Birla Sun Life Mutual Fund

### 8. Significance of the Research

The Mutual fund in monthly income plan in Indian Industry is one of the financial instruments play in capital market, after 2009 high growth of mutual fund industry in India. Mutual fund provides more benefit to small investors.

- Level of Risk
- Level of Return
- Correlation of Book Value Ratio and Price Earnings Ratio.
- Assets Under Management
- Diversification of Assets
- Net Assets Value.

### 9. Data Collection

This study is completely based on the secondary data. This data is collected from various source specially from the journal – — Mutual Funds – Insight — based on Value Research Magazines , and addition to others journals, magazines, articles, books and the publisher and unpublished documents of the mutual funds have been consider in the research.

### 10. Financial and Statistical Tools for Measurement

- Average
- Standard Deviation
- Beta
- R – Square
- Sharpe– Ratio
- Earnings Per Share
- NAV
- Price to Book Ratio

### 11. Period of Study

The Performance of sampled scheme would be plan review for two and half years.

### 12. Tools of Analysis

- Jenson Measure
- Treynor’s Performance Index

### 13. Limitation of the Study

- The research done only selected a scheme which was related with five rating star and the value research magazine.
- The data would not collect to the Assets Management Company data sheet, but collection from the market or secondary source.
- The research analysis was based on the past performance of the only selected Equity Diversified Scheme.
- The research had been based on the Net Assets Value, that NAV continuous fluctuation
- The research analysis compares the Net Assets Value and Expense Ratio, but NAV continuous fluctuation.
- Fund manager investment style based on capital market situation. It could not possible always pursue the mentioned objectives.
- Equity Diversified schemes having different objectives due to sector wise allocation of the fund.
- Performance measurement techniques should not give equal weight to each of the schemes.
- Sharpen Performance evaluation is based on variance, not cover market risk and that risk also affect fund return.

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Magazine Mutual Fund Inside: Value Research, Rating of Mutual Fund, Equity Fund, Balanced Fund, Income Fund, Monthly Income Plan, Rating on return, net asset value, price earnings ratio, price book ratio, assets under management.

Financial Analysts, under University of ICFAI, detail mention how to calculate the Sharpen Ratio, Jenson Ratio, Treynor’s Ratio

### 15. Overview of Mutual Fund in Monthly Income Plans In India Industry

The Mutual fund in monthly income plans in Indian Industry, based on the trust who invests the savings of a number of investors who shares a common financial goal. Capital market instruments such as shares, debenture, and foreign market. Investors invest money and get the units as per the unit value which we called as NAV (net assets value). The common features of the mutual fund unit are low cost. Investors in India opt for the tax-saving mutual fund schemes for the simple reason that it helps them to save money. The tax-saving mutual funds or the equity-linked savings schemes (ELSS) receive certain tax exemptions under Section 88 of the Income Tax Act. That is one of the reasons why the investors in India add the tax-saving mutual fund schemes to their portfolio. The tax-saving mutual fund schemes are one of the important types of mutual funds in India that investors can option for. There are several companies in India that offer – tax – saving mutual fund schemes in the country.

### 16. Research Methodology

The Research methodology is a way to systematically solve the research problem. It is a science of studying how research is done scientifically. Researcher not only needs to know how to develop certain indices or tests, how to calculate mean, standard deviation and beta, after that goes for financial and statistical tool to arrive at conclusion.

### 17. Overall Performance Evaluation of Mutual Fund

Overall performance shows evaluation of equity diversified scheme, balance funds, index fund, income fund, schemes based on period of time, which analyses fund performance on third chapter, analysis of net assets value and assets under management, other measurement liked price earnings ratio and book price ratio position of schemes.

<b>MIP VS other Debt Products</b>				
	By : Jagoinvestor.com			
<b>Criteria</b>	<b>Monthly Income Plans</b>	<b>Fixed Deposits</b>	<b>Post Office Monthly Scheme</b>	<b>Fixed Maturity Plans</b>
Risk	Low-Risk	No	No	Low-Risk
TDS	No	Yes	No	No
Return range on average	6-12%	7-8%	8%	9-10%
Complexity	Moderate	Easy	Easy	Moderate
Assured Monthly Income	No	Assured	Assured	Not available
Max Limit	No Limit	No limit	4.5 lacs for Single and 9 lacs for joint account	No Limit
Penalty for Early Withdrawal	1%	1% less interest will be paid	2% before 3 yrs 1% after 3 yrs	0 - 2.5 %
Tax on returns	<b>Before 1 yrs</b> As per you tax slab <b>After 1 yr</b> 10% or 20% with Indexation	As per your tax Slab	As per your tax Slab	<b>Before 1 yrs</b> As per you tax slab <b>After 1 yr</b> 10% or 20% with Indexation

Figure 1

<b>Best performing Monthly Income Plans and their Performance</b>				
<b>MIP Name</b>	<b>Since inception</b>	<b>5 yr Return</b>	<b>3 yr return</b>	<b>Expense Ratio</b>
Reliance MIP	11.34%	11.66%	12.51%	0.80%
HDFC LT MIP	12.17	11.57%	9.53%	1.82%
BSL MIP II Savings 5	9.76	9.76	11.22	0.24%
Canara Robeco MIP	13.25	11.93	7.64	1.68%

Source : Valueresearch

Figure 2

### 18. Summary, Finding and Suggestion

The only selected a scheme which was related with five rating star and the value research magazine. The data would not collect to the Assets Management Company data sheet, but collection from the market or secondary source. The research analysis was based on the past performance of the only selected Equity Diversified Scheme. The research had been based on the Net Assets Value, that NAV continuous fluctuation the research analysis compares the Net Assets Value and Expense Ratio, but NAV continuous fluctuation. Fund manager investment style based on capital market situation. It could not possible always pursue the mentioned objectives. Equity Diversified schemes having different objectives due to sectors.



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## **Business Intelligence and Information Management: its Usage Within Human Services**

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### **1. Introduction**

The Department of Human Services (DHS) is responsible for the development of service delivery policy and provides access to social, health and other payments and services. It was created on 26 October 2004 and integrated the services of Medicare Australia, Centre link and CRS Australia on 1 July 2011 into the Department of Human Services after the Human Services Legislation Amendment Act 2011 was enacted.

The department offers a range of health, social and welfare payments and services through the following Master programs:

- Medicare (payments and services for Pharmaceutical Benefits Scheme, Incentives programs for doctors, nurses, the Australian Childhood Immunisation Register, the Australian Organ Donor Register, etc)
- Centre link (payments and services to retirees, the unemployed, families, carers, parents, people with disabilities, Indigenous Australians, etc)
- Child Support (provides support to separated parents to provide the financial and emotional support necessary for their children's wellbeing)
- CRS Australia (payments and services related with disability employment services to help people with a disability, injury or health condition to get or keep a job, and help their employers to keep their workplaces safe).

To keep things in perspective, for example, the budget estimates of the department for 2013-14 for making payments and providing services to the citizens on behalf of 3<sup>rd</sup> party is in the order of \$158 billion.

The process of effective dispensing of a large amount of payments to its clients base by the Department of Human Services (DHS) and effectively complying with the high compliance standards setup by the Commonwealth government, an effective decision making process is a core requirements for this business to be effectively implemented. To conduct this business and to improve opportunities and performances of these business requirements, it's anticipated that a vital role shall be played by Business Intelligence (BI) within DHS. Within DHS a research is being conducted to effectively implement the Business Intelligence Systems so that the BI setup understands the various environments within DHS and follows systematic information processes.

### **2. Review of Literature**

The term Business Intelligence (BI) represents the tools, systems, methodology and processes that may play a key role in the strategic planning processes of DHS. These systems may allow DHS to effectively gather, store, collate access, analyze and produce intelligence information that relates to the corporate data to aid in effective, efficient, and timely decision-making processes.

In general these systems may perform business intelligence in the areas of customer profiling, customer support, customer risk factor, providers profiling, providers support, providers risk factor that facilitate research, statistical analysis, and compliance satisfaction both at customer and provider levels within DHS.

DHS collects a large amount of data of Australian citizens, service providers, 3<sup>rd</sup> party organizations, interpreters, etc for its business operations. To keep track of this information, DHS relies on databases, data marts, EDW and Teradata. The technical platforms used within DHS ranges from Midrange to Mainframe and use a wide range of software programs, such as SAS, SAP, Web Sphere, Web Methods, CICS, COBOL, MQ etc to access, maintain and analyze information from diverse platforms. Obviously using multiple software programs makes it difficult and challenging to retrieve information in a timely manner and to perform analysis of the data.

### **3. Objectives of the Study**

In order to provide access to data across diverse platforms with DHS and ensure payments are made on time to needy Australian citizens, supporting services are of high standards and to ensure that the compliance targets are achieved, the department has set up a

Key Performance Indicators (KPI) for the compliance side of the business. For instance the KPI for Centre link Master Program is set to be debt under recovery be more than 60% and completed audit and review cases under 2,500 for the Medicare Master program. In order to attain these high standards of compliance KPIs, the department is relying on the leading edge technology of Business Intelligence (BI) and Information Management Tools.

Business Intelligence is not only a combination of software products only, however, to attain optimal results DHS is committed to establish a corporate repository of a set of methodologies, processes, architecture patterns, in combination of leading edge technologies that transform raw data into meaningful and useful information that is used to enable more effective strategic, tactical, and operational insights and decision-making.

The Business Intelligence is being set up within DHS to envisage connected decision-makers not only across all levels of the department but across different Master Programs as well thus resulting in disseminating relevant, timely, accurate and actionable information.

#### **4. Hypothesis**

The customer base for DHS ranges from citizens to health providers to other organizations. It is business critical to provide frequent changing services to all these customers in an efficient, effective and reliable manner.

The Business Intelligence software and applications shall help DHS to provide these services at expected standards, maintaining agility by identifying, aggregating and analyzing data to support quantitative decision making. The intent is that a highly compliance system be built for DHS that it complies with the high standards setup by the Commonwealth to effectively, efficiently and timely dispense payments within needy Australian citizens.

#### **5. Major Findings**

Business Intelligence setup within DHS has enabled its decision making machinery to provide with a scalable decision support systems. Business users at various levels within DHS and its customer base accessing DHS system through mobile, self service channels (Kiosk, web based), have become much more adept in their use of technology, and the speed of business has increased; thus created a need for proper decision support systems within DHS. Business intelligence setup within DHS has had evolved to keep pace, and had now met the needs of both business users and IT professionals. This setup with DHS is a trickier one than it sounds, as these two groups (business and IT) appear to approach the concept of BI from diametrically opposed perspectives. The requirement is that the business users within DHS expect the freedom and ease of use to access BI solutions that provide them intelligence reporting to comply with compliance of the business. Whereas IT's expectation within DHS are around the level of reliability, performance, scalability, availability and security from all types of enterprise software.

A reliable foundation is addressed and is critical to ensuring sustainable benefits from BI within DHS. With the right technology, redundancy and proper load balancing the solution using BI services is evolved and cater for the real time needs of the citizens, health providers and other organisations. Effective BI within DHS has given business users the freedom to collaborate and extend BI so that they can share insights, achieve alignment and make better decisions faster. Today, DHS rely on Business Intelligence solutions and systems to cut costs, set targets and allocate the resources to achieve goals. Predictive Analytics, Budgeting & Planning and Financial Performance Management are some of the key Business Intelligence Software aspects those are considered within DHS to support quantitative decision making.

#### **6. Important Suggestions**

The BI setup within DHS has achieved the following five primary factors to achieve government's agenda, goals and objective setup:

##### *6.1. Inform*

Facilitated to deliver the right information to the right people in the timely manner within DHS across various Master Programs. Information held within DHS databases is the most important asset for the department. This data is collected from day-to-day operations from various citizens, service providers, etc. This data is stored in data warehouses and accessed by the enterprise resource planning systems or other sources to provide meaningful form to the data. It is critical for understanding and driving business performance within DHS. Access to the right information is now even more crucial with the growth of the web and its vast store of data on customers and providers.

The key to maximising information value is to get the information to where it is needed at the right time. Many of the DHS Customers get to access their data through self service and or mobile channels.

The right BI software adapted within DHS does this in a way that users can quickly understand and trust. This is achieved using a unified, uncluttered BI workspace that delivers data through customisable reports and dashboards, and communicates complex information quickly with maps, charts and other graphics.

##### *6.2. Engage*

Make the best use of the resources within DHS that is driven to outperform. Delivering time, relevant information is important, but real BI begins with users who are engaged in exploring, analysing and using the information. DHS does business in partner with other departments and dispense payments on behalf of 3<sup>rd</sup> party organisations. So its business is relied on for both information and insight to understand the tactical and strategic implications.

The goal of DHS is to collaborate with other departments and create a culture of actively engagement with information to contribute actionable insights. This requires a BI solution that goes well beyond the traditional toolset, and gives users the ability to analyse situations immediately and consider possible outcomes. This requires easy understanding of tactical and strategic implications of proposed actions, quick analysis of large data sets, and fast and predictable response times.

### *6.3. Align*

Accelerate the decision making process within DHS. The ultimate goal of implementing BI within DHS is to help implement a better decision support system. As the best decisions are rarely made in isolation, multiple inputs are shared, analysed and agreed on. A collaborative decision-making process is aligned to tactical decisions with strategic goals, and tie business processes together across DHS various Master Programs boundaries.

This requires two types of alignment – vertical alignment down the decision chain starting at the executive level, and horizontal alignment that where functions collaborate and make strategic decisions across processes and departmental boundaries (Centre link, Medicare, Child Support Master Programs). Built-in collaboration and social networking is essentially used to exchange ideas and knowledge.

### *6.4. Agile*

Enable IT to respond promptly to changing business demands. DHS has built common business capabilities and reusable IT components using various architecture patterns. This forms a reliable foundation that addresses both current needs and is capable to address future requirements in agile manner so that critical business functionality can be delivered within no time. This ensures sustainable benefits from BI within DHS. With the right architecture, the solution is evolved with the needs of DHS, without placing extra burden on IT departments.

### *6.5. Optimise*

Enable IT to respond effectively, efficiently and reliably to changing business and users' frequent demands.

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## Changing Nature of Organizations

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### **Abstract:**

*A change is a shift in some condition or situation from its present state to a new and different state. A change can range from minor shifts in procedures or technology to a revolutionary shift in roles within a society. The word “change” is often used to refer both to a shift that occurs in the organization’s external environment, as well as the changes that occur inside of the organization in response to shifts in its external environment. In this paper, the term, environmental change, will refer to external shifts and the word organizational change will refer to the internal shifts made by an organization as it responds to external shifts. Organizations evolve and come to be seen as dynamic, coping systems, the concept of how they change and methods by which they manage change have continued to be refined. Managing a process of change in an organization can be a highly complex task and is often essential for effective organizational development (OD). Imagine you went to sleep and woke up to a work day in 1960. How different is your work life today, compared to what it was 40 years ago? Clearly, there would not be a Starbucks on every corner or a cell phone in every pocket but what else has changed and why? In today’s world, the structure, content, and process of work have changed. Work is now more cognitively complex, more team-based and collaborative, more dependent on social skills, more dependent on technological competence, more time pressured, more mobile and less dependent on geography. In today’s world, you will also be working for an organization that is likely to be very different due to competitive pressures and technological breakthroughs. Organizations today are leaner and more agile, more focused on identifying value from the customer perspective, more tuned to dynamic competitive requirements and strategy, less hierarchical in structure and decision authority, less likely to provide lifelong careers and job security, continually reorganizing to maintain or gain competitive advantage. In this paper I would like to discuss various key drivers, dynamics, technological and critical aspects of change in organizations.*

**Key words:** Organizational Change, Key Drivers, Technological Change, Critical Aspects and Process of Change

### **1. Introduction**

In today’s world, the structure, content, and process of work have changed. Work is now more cognitively complex, more team-based and collaborative, more dependent on social skills, more dependent on technological competence, more time pressured, more mobile and less dependent on geography. A change can range from minor shifts in procedures or technology to a revolutionary shift in roles within a society. The word “change” is often used to refer both to a shift that occurs in the organization’s external environment, as well as the changes that occur inside of the organization in response to shifts in its external environment. Change is generally a response to some significant threat or opportunity arising outside of the organization. In this sense it is important that an organization continually monitors what is happening around it. It develops a sense of awareness which stems from realizing the need to set in motion changes that will keep it in. It is evident that for the organization to survive, let alone thrive, change needs to be considered by management at all levels. It is necessary to consider what the causes of change are and what actually needs changing. The main causes of change that give rise to change programmes being initiated can be classified as follows as;

External causes of change can be as a result of changes in the level of technology used, market place changes, customer expectations, competitor activities, quality and standards, government legislation or political values, as well as changes in the economy. Depending on their current situation and aspirations, different companies will react to these external stimuli in different ways.

Internal context of change relates to management philosophy, structure, culture and the system of power control.

## 2. Definition

Changes within an organization take place both in response to business and economic events and to processes of managerial perception, choice and actions. Managers in this sense see events taking place that, to them, signal the need for change.

Pettigrew (Daft, 1983)

## 3. Review of Literature

Organizational change has also been referred to as organizational development and organizational transformation (Cummings and Worley, 2005; Newhouse and Chapman, 1996). The causes of organization change can be explained by one theory, the teleological perspective believes that organizational change is an attempt to achieve an ideal state through a continuous process of goal-setting, execution, evaluation, and restructuring (Van de Ven and Poole, 1995). Organization theory and management: cases, measurements, and industrial applications, mention that in most common known targets of organizational change includes vision, strategy, culture, structure, system, production technology, and leadership style. Greenwood and Hinings (1996) note that “convergent change is fine tuning the existing orientation”. Because of the pace of change today, it is radical, not convergent change in which we are interested. Therefore, it is necessary to define change and organizational transformation in terms of the degree to which organizational change occurs as well as how rapidly the change occurs. Regardless of its speed, organizational change is the movement of an organization from the existing plateau toward a desired future state in order to increase organizational efficiency and effectiveness (Cummings and Worley, 2005; George and Jones, 2002).

## 4. The Process of Change

Kurt Lewins (1958) described the change process of an organizational system such as a series of transitions between three different states: unfreezing-transition-refreezing. Still considered one of the most accurate descriptions of how change occurs (Kelley and Conner, 1979; Kezar, 2001; Schein, 2002), the model describes change as a series of transitions between different states. No change will occur unless the system is unfrozen, and no change will last unless the system is refrozen. Most theories of change tend to focus only on the middle state and therefore cannot explain the inability of change initiatives to produce change in the first place, or to maintain the changes that have been achieved.

**Please refer figure.1 in Appendix.**

### 4.1. Unfreezing State

The initial state of the system reflects a condition of relative stability. When a disruptive force affects the status quo, people are motivated to discontinue some aspect of their behavior. Their established frames of reference, accepted patterns of behavior and old methods of operation are invalidated. Unfreezing invalidates established frames of reference and accepted patterns of behavior. Old methods and behaviors become inoperative. This in turn generates tension, ambiguity, and confusion as to what is appropriate. People feel a high need for a new operating framework. The confusion that results from their inability to understand and control the environment produces stressful situations and a need to reduce the anxiety. People have a desire to seek out, process and utilize information to create a new state of stability. They are eager to do whatever is necessary to regain some sense of control. These unpleasant aspects of the unfreezing state make it possible for new learning to occur.

The present state reflects the current condition of relative stability or the status quo. Unless this state is modified by a disruptive force, it will continue indefinitely. When the status quo is disrupted, it “unfreezes” the present state. This unfreezing from the present state to a state of transition occurs when people are motivated to discontinue some aspects of their behavior.

Unfreezing, the most difficult and important stage in the change process, creates the motivation to change. This is accomplished by changing the forces acting on the system such that the present state is somehow disconfirmed, some anxiety or guilt is aroused because some goals will not be met or standard or ideals will not be maintained and enough “psychological safety” is provided to make it unnecessary for individuals or groups to psychologically defend themselves because the disconfirming information is too threatening or the anxiety or guilt is too high.

### 4.2. Transition or Change State

The transition state represents a phase of the change process when people are no longer acting as they used to, but neither are they set in a new behavior pattern. It is a “fluid” state in that the motivation to change has disrupted the present equilibrium, but the desired state has not yet been formed. The motivation to change has disrupted the system's present equilibrium, but the desired state has not yet been formed. Confusion results from the inability of people to understand and control the environment producing stressful situations. Tension is generated because people have a need for a new operating framework of behavior. The need to reduce anxiety promotes a powerful desire for seeking out, processing and utilizing information to create a new state of stability or revert to the old state. When people without a sense of equilibrium are uncomfortable, they are eager to do whatever is necessary to regain it. These unpleasant aspects of the transition state make it possible for new learning to occur if planned.

The transition state embodies danger and opportunity for the person or organization involved. One of the consistent findings about the change process is that there is initially a decrease in an organization's performance during the transition as the change is implemented into the ongoing activities of the organization (Fullan, 2001). This “implementation dip” represents not only a drop in performance,

but also the uncertainty of individuals within the organization as they encounter unfamiliar situations that require new skills and knowledge. Successfully working through the implementation dip, therefore, requires administrators and other change leaders to not panic when things do not go smoothly during this phase of the change process. Effective leaders recognize that change is a process, not an event, and show empathy towards individuals who display anxiety, confusion and uncertainty during the transition portion of the change process.

#### 4.3. Refreezing State

At some point, the uncertainty of the transition state, in conjunction with the need for stability, begins a process of stabilizing and integrating the change. This process of learning new behavior patterns is called refreezing. Once the person or group has achieved a new set of cognitions and attitudes, and has begun to express these in new daily behavior, there remains the state of refreezing. For the new behaviors to last, they must first fit into the personality of the individual and the culture of the organization that is being changed. Otherwise, the behavior will be only a temporary adaptation to the pressure of the change situation and will erode once the change agent has ceased to disconfirm the old behavior. Refreezing at this level can be thought of as “personal integration.” Even if such personal integration has taken place, new behaviors may not remain stable unless they also fit into the ongoing relationships and the work context of the person or group that has changed. If the unfreezing and transition states are well planned and managed, the result of the refreezing process is the desired state. If the first states are, however, not handled appropriately, the people and the organization will refreeze, but not necessarily in the desired state.

### 5. Key Driven For Nature of Change in Organization

There is a new pattern of change emerging driven by information and communications rather than leadership and vision. This is a new cycle. It is interesting because it is qualitatively different from what we all know about change management. The traditional pattern for change rests on:

- Problem: Something is wrong, the problem is defined, given shape and the need for change is communicated.
- Solution: The actions you take to address the problem either wrapped in the term initiative or program. The assumption is that there is a solution to each problem. The assumption is that the solution, properly applied, will solve the problem, if it did not then why go to the effort of implementing the solution.
- Adoption: The acceptance of the solution by the workforce. This is the change part of the change process as people are assumed to discontinue old ways of working in favor of new approaches. A well-executed adoption process will ensure the solution is applied properly in order to solve the problem and raise performance.

The logic of Problem/Solution/Adoption to change gives the whole process a mechanistic or programmatic approach, show in the figure below. Follow the steps properly and you will get the intended results. It's interesting that when people encounter difficulties in the change process and they ask for help, the answer is that you must not have done the steps right.

**Please Refer Figure 2 in Appendix.**

### 6. The Seven-Stage Model of Change

Whilst Lewin's model provides a simple and understandable representation of the organizational change process, more recent models have developed his model and extended the idea into more depth. In 1980, Edgar Huse proposed a seven-stage OD model based upon the original three-stage model of Lewin.

- Scouting - Where representatives from the organization meet with the OD consultant to identify and discuss the need for change. The change agent and client jointly explore issues to elicit the problems in need of attention.
- Entry - This stage involves the development of, and mutual agreement upon, both business and psychological contracts. Expectations of the change process are also established.
- Diagnosis - Here, the consultant diagnoses the underlying organizational problems based upon their previous knowledge and training. This stage involves the identification of specific improvement goals and a planned intervention strategy.
- Planning - A detailed series of intervention techniques and actions are brought together into a timetable or project plan for the change process. This step also involves the identification of areas of resistance from employees and steps possible to counteract it.
- Action - The intervention is carried out according to the agreed plans. Previously established action steps are implemented.
- Stabilization & Evaluation - The stage of 'refreezing' the system. Newly implemented codes of action, practices and systems are absorbed into everyday routines. Evaluation is conducted to determine the success of the change process and any need for further action is established.
- Termination - The OD consultant or change agent leaves the organization and moves on to another client or begins an entirely different project within the same organization.

Practice: The 7-stage model is a useful heuristic to illustrate the complex nature of organizational change. However, such neat linear models are prone to oversimplify situations. The pace of organizational change in today's rapidly developing economic climate can result in the 'refreezing' stage never being reached or completed. This means that organizational systems often undergo a continuous series of change interventions and rarely revert to a stabilized state of equilibrium. In other words, change is often so rapid and recurrent that the system fails to restabilize itself before the next change initiative is conducted. Organizations prone to fashion and fads in managerial practice particularly suffer from this effect.

## 7. Technology

Without change, business leaders still would be dictating correspondence to secretaries, editing their words and sending them back to the drawing board, wasting time for all involved. Change that results from the adoption of new technology is common in most organizations and while it can be disruptive at first, ultimately the change tends to increase productivity and service. Technology also has affected how we communicate. No longer do business people dial a rotary phone, get a busy signal, and try again and again and again until they get through. No longer do business people have to laboriously contact people, in person, to find out about other people who might be useful resources - they can search for experts online through search engines as well as through social media sites. Today's burgeoning communication technology represents changes that allow organizations to learn more, more quickly, than ever before. Technology continues to rapidly evolve as a differentiator in the marketplace. The implementation of new technology consumes a significant portion of business investment with promises of greater efficiency, productivity and performance gains. Organizations intent on maintaining or increasing business results need to make judicious investments in technology and effectively manage the implementation. Technologies such as mobility, cloud computing, web conferencing and tele-presence have driven connectivity across the globe. Employees can work in different locations or on the road and still collaborate. Obtaining and sharing knowledge 24/7 is becoming easier and faster and this is accelerating as mobile and Internet devices are becoming more accessible in emerging markets and from more remote locations. Allowing people to work remotely increases the opportunity to utilize people capability without requiring people to move.

## 8. Critical Aspects of Impact

The impact of change on an organization is manifested in multiple ways. There are various aspects that are impacted in organizational change. These are as follows:

- Amount: The number of alterations required by the change.
- Scope: The range or span of the organization affected by the change.
- Time: The amount of time the participants have to implement the change.
- Transferability: The degree to which the change is easy to communicate and will be understood by participants.
- Predictability: How well the participants can accurately anticipate the effect of the change on them.
- Ability: The degree to which change targets feel they have or can attain the knowledge and skill necessary to implement the change.
- Values: The degree to which the change targets must change some of their strongly-held beliefs about the way they are operating.
- Emotions: The extent to which the change requires targets to feel differently about people or operating procedures.
- Knowledge: The degree to which the change requires participants to learn new information or view existing information differently than they have in the past.
- Behaviors: The extent to which the change requires targets to modify their daily routine of job-related activities.
- Logistics: The degree to which the change requires any significant alteration in the targets' job procedures, such as scheduling, time management, and equipment utilization.
- Economics: The degree to which the change requires targets to operate differently regarding budgets, expenses, or funding.
- Politics: The degree to which the targets must modify their current methods of influencing others, utilizing power, networking, teamwork, dealing with territoriality, or protecting vested interests.

## 9. Conclusion

Change is an important issue in organizations. It is actually a process in which an organization optimizes performance as it works toward its ideal state. Organizational change occurs as a reaction to an ever-changing environment, a response to a current crisis situation, or is triggered by a leader. Successful organizational change is not merely a process of adjustment, but also requires sufficient managing capabilities. Changing the workplace itself is relatively easy. Changing the behaviors and mind-set needed to work effectively and realize the benefits of workplace changes is challenging. The timely and continuing adaptation of companies to the rapid changes in the market is a prerequisite to survival and growth. Simultaneously, the smooth adaptation of employees to changes contributes not only to the improved running of organizations but also to their personal improvement and enhanced satisfaction. The need for change requires the adaptability of organizations and enterprises, the redesigning of the organizational models, continuing reconstruction, learning processes and employees training. Overall Change nature in organization is very important to move with current marketing situation. It also helps to adapt the take new challenges and technology to survive in the global competition.

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**11. Appendix**

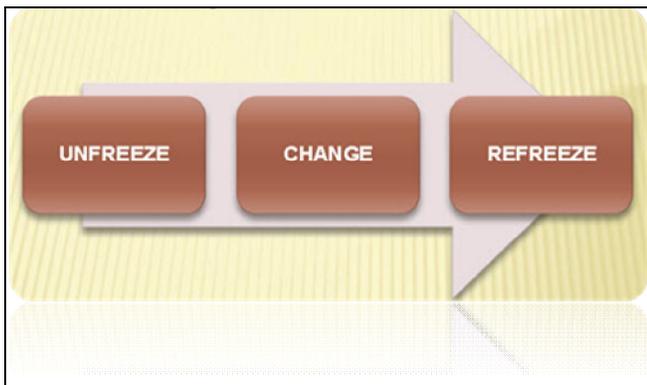


Figure 1: The Process Of Change; Kurt Lewin Change Model

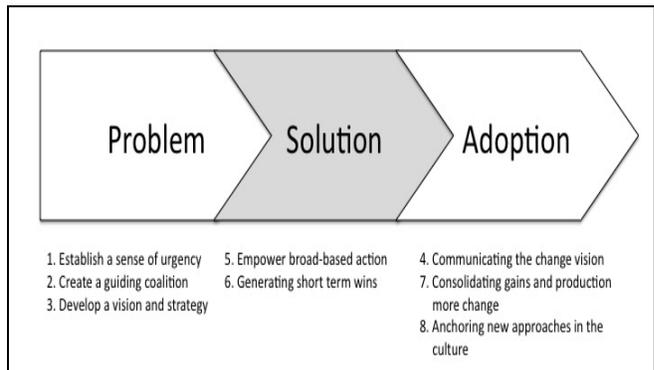


Figure 2: Key Driven For Nature Of Change In Organization



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## Emotional Intelligence of Correctional Officers of West Bengal

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### **Abstract:**

*This study aims to investigate the perceptions of emotional intelligence of correctional officers of West Bengal correctional service working at various functional units and different hierarchical levels. Data were collected from 224 correctional officers by means of questionnaires in a series of face-to-face structured interviews regarding emotional intelligence. Factor analysis provides support for the model, which suggests that supervisors' overall emotional intelligence and its domain. Reliability coefficients of the scales as assessed with Cronbach  $\alpha$ , were also exhibit high internal consistency. There exist a significant variation of emotional intelligence with variation of age, experience and designations. This study contributes to our understanding of the linkage among emotional intelligence of correctional officers of West Bengal correctional service and the impact on teamwork with their subordinates for healthy dealing with inmates (prisoners).*

**Key words:** Emotional intelligence, correctional officers, age, experience and designations

### **1. Introduction**

Interest among social scientists on emotions as a domain of intelligence has grown in recent years, which are different from Intelligence Quotient (IQ) (Stern, 1961) and multiple intelligence [18]. Of course in the corporate sector, IQ helps one to pass the hurdle of entry in an organization, the emotion as a domain of intelligence helps to develop a coping skill to deal with interpersonal relationships, and development of cooperative work culture for achievement of goal.

Salovey and Mayer (1990) coined the term “Emotional Intelligence” and described it as “a form of social intelligence that involves the ability to monitor one's own and others feelings and emotions, to discriminate among them and to use this information to guide one's thinking and action. Emotional Intelligence according to them includes

- i) Identifying emotions,
- ii) Understanding emotions
- iii) Using emotions
- iv) Managing emotions [43].

In the later part, they define emotional intelligence (EI) as “the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth”. Similarly, Emotional Intelligence as 'the capacity for recognizing owns feelings and those of others, for motivating oneself and for managing emotions well in oneself and others. Emotional Intelligence has been considered as the competencies of the individual with respect to the following cluster of variables. i) Self awareness: capacity for understanding one's emotions - strength and weakness; ii) Self management: capacity for effectively managing one's motives and behavior; iii) Social awareness: capacity for understanding what and why others are saying and feeling iv) Social Skills: capacity for acting in such a way that one is able to obtain the desired [23]. Emotional Intelligence reflects one's ability to deal with daily environment challenges and helps predict one's success in life, including professional and personal pursuits [4]. These definition and other are complimentary [7].

Although the concept of EI is not without its critics [14] [31]. EI is a construct that has attracted considerable attention [22] [23] in predicting workplace outcomes, including job performance [52] and satisfaction [55]. Also, EI is a construct that may impact core affective processes to influence the quality of supervisor–subordinate interactions [13] [37].

In their proposed model, Mayer and Salovey (1997) have estimated that emotional intelligence plays an important role in regulating and controlling emotions as well as intellectual [34] and cognitive processes [33] [48]. The absence of this skill implies an uncertainty

in decision making [39][47] [51] [54]. Scholars and writers in management are beginning to emphasize the importance of EI on leadership effectiveness [37][23][6][41][42] for better team management.

In particular, this study investigates the supervisor's level of emotional intelligence (EI). The investigation was concentrated on the correctional administrator of the correctional homes in West Bengal.

### *1.1. Introduction of Correctional Homes and Correctional Officers*

With the change in the perception towards prisoners, prisons are no longer considered as a place for punishment but as correctional home. Therefore in present day scenario, there is a need to create a healthy environment inside the correctional home so that inmates can return to the society as healthy citizen. Many of the problems in the Jails are an offshoot of neglect by the correctional officers. Reason behind such that there is no organized or systematic effort to bring about changes in a sustained and institutionalized manner because of a variety of reasons, prime among them is not to give due importance of the personnel management in the Jail administration.

#### 1.1.1. Role Expectation from a Prison (Correctional) Officer

The role played by the prison Officers is not only a complex one but also a totally professional task. The West Bengal correctional services Bill 1992, also places a lot of responsibility on the Staff in ensuring that a prison is basically for the reformation of a prisoner so that on his release from the Jail he is able to adjust easily into the community life. The Act has prescribed various functions for the Correctional Homes. Some of the important functions that have been included in the Act are:

To give correctional treatment to the prisoners so as to efface from their minds the evil influence of anti social ways of life and rehabilitate them in society as good and useful citizens.

To adopt ways to ensure that a prisoner does not fall prey to the depriving mental attitude, which may make him believe that he is lost to society;

To adopt measures calculated to rouse in the mind of a prisoner a healthy social sense and a sense of abhorrence against the anti social ways of life.

To adopt measures to ensure effective after care service of the released prisoners.

Depending on the types of inmates, types of Govt. order and the situation of the home they need to take part in counseling, advising, controlling, monitoring and developing the activities inside the home. Hence a coping skill to deal with interpersonal relationships, which involves the ability to monitor one's own and others feelings and emotions, to discriminate among them and to use this information to guide one's thinking and action for the development of cooperative work culture for achievement of goal is required.

Hence to revamping of the "correctional services", at first it is necessary to identify the present level of social intelligent or in broader sense emotional intelligence of the correctional officers, so that they can exert their full competency for their service happily.

### *1.2. Objectives of Study*

The following objectives of study were considered:

- To investigate the level of emotional intelligence of the correctional officers of West Bengal with variation of age, experience and designation.
- To investigate the significant difference of emotional intelligence of the correctional officers of West Bengal with variation of age, experience and designation.

## **2. Survey of Literature**

The declaration of Indian Jails Committee about the reformation and rehabilitation of offenders is the ultimate objective of prison administration. This has brought out the essential aim of reformation and social rehabilitation (Model Prison Manual, 2003). India is seem to none in terms of an enlightened thinking with regard to the purpose and objectives of imprisonment of the gap between proclaimed principles and actual practices appeared to have been widening recent years. However in probing this complicated opaque world of prisons, academicians has left no stone unturned and sociology of prison is increasingly gaining dominance as an independent discipline within the gamut of social science. But there is little intervene with the study on organizational behaviour or organizational psychology to identify the psychological competencies as well as influencing organizational and personnel variables on competency.

In this article, first a review of the literature on EI will be presented and then the hypothesis and methodology part will be explained regarding sample, procedure and measurement. Finally after providing research findings and discussion session, scope for future research will be addressed.

### *2.1. Emotional Intelligence*

A study on Emotional Intelligence, leadership style and coping mechanisms of executives by Purkable, Terry Lyn (2003) opined that the organizational leaders frequently use emotions to influence the affective states of others. Leban (2003) identified that the success of complex projects depends on the relationship between rational leader behaviour and emotional intelligence of the project manager. Cannalo and Brierza (2002) showed that the highest performing managers had significantly more 'emotional competence' that other manager. Leaders high on Emotional Quotient generated hope and conviction because they could instil confidence in people who were frightened to situations [12]. Sternberg (2002) suggests that there are other dimensions of intelligence-social intelligence, EQ, or

practical intelligence or what scholars refer to as "street smarts"-which indicates that an individual is not limited simply because he or she has a below average academic intelligence or IQ [50]. Studies on the US Air Force when they began using emotional intelligence tests to select recruiters showed, it immediately saved \$3 million a year through greater effectiveness and lower turnover and associated costs [50]. Boyatzis (2001) studying on several hundred managers from 12 different organizations showed one of the foundations of Emotional competence ie accurate self-assessment was associated with superior performance [7]. Ciarrochi et al (2002) argued that the ability to cope with aversive affect and stressful situations is related to one's ability to manage emotions [11]. The Consortium for Research on Emotional Intelligence in Organization (2000) points out that in a manufacturing plant, after the supervisor received a training in emotional competencies production increased by 17% [12]. Leaders who are high in EI may be more likely to cultivate trust and cooperation from their subordinates [19]. A study Walter V, Clarke (1997) of 130 executives found that how well people handled their own emotions determined how much people around them preferred to deal with them. De-Drev et al (1995) confirmed that people with higher emotional intelligence face a crisis situation more efficiently with good problem solving, decision making skills [22].

Although Gardner (1983, 1999) did not use the term EQ, his concepts of intrapersonal intelligence deal with the ability to understand one's own emotions and interpersonal intelligence is one's ability to understand the emotions of others[22] [23]. Goleman (2001) suggested that this intelligence is associated with social competencies, such as empathy and social skills [24]. In his research indicated that the manager's who don't feel a responsibility to others can't handle stress, are unaware of their own emotions, lack the ability to understand others, or erupt into anger easily are viewed as likely to derail due to problems dealings with other people[23]. 80 Ph D's in science undergone a battery of personality tests, IQ tests, and interviews in the 1950s at Berkeley. After forty years when their success based on resumes, evaluations by experts in their own fields were made, it turned out that social and emotional abilities were four times more important than IQ in determining professional success and prestige (Daniel Crdemar's book on Emotional Intelligence, 1998) [18].

Several researchers have attempted to develop measures of EQ [4] [44] [35] [8] [32] [42] [22] is the progenitor of the EQ construct. In his role as a consultant in organizations, Gardner (1983) [17]; ([22] [25]) found that EQ is twice more important than technical skills and IQ for jobs at all levels. He also reported that EQ plays an increasingly important role at the highest levels of a company. It appears that EQ relates to a number of non-cognitive skills, abilities, or competencies that influence a manager's capacity to deal with environmental demands and pressures.

Another issue is that in organizational studies, supervisors are often asked to assess their own managerial skills, but studies reported that unsuccessful supervisors overestimate their skills compared to successful supervisors [30] [46]. Also three studies reported that under-estimators of their managerial skills are likely to be more effective than over-estimators [2] [53] [9]. As a result, if the supervisors are asked to self-assess their EQ, some of them will probably provide misleading information.

### **3. Methodology**

#### *3.1. Hypothesis*

Several scholars use the term EI to include emotional awareness, accurate self-assessment, self-confidence, trustworthiness, adaptability, conscientiousness, innovation, and so on [23][4]. Also, studies reported that self-awareness is an essential ability for enhancing managerial effectiveness [9] [46], also a prerequisite for self-regulation, empathy, and social skills [24]. In order to understand the emotional processes and deal with them effectively, one needs to have Perception of emotion, Managing own emotion, Managing emotion of others and Utilization of emotion of others [9] [15].

Matching with the subjects of the study we selected the domains of EI Perception of emotion, Managing own emotion, Managing emotion of others and Utilization of emotion of others for the present study because we believed that: - manifestations of these domains of EI in an organizational context with variation of age, experience and designation will have a significant influence on officers' perceptions of their own managerial skills. We selected these domains of EI for the present study because we believed that: - manifestations of all the domain of EI in an organizational context will have a significant influence on officers' perceptions of their work effectiveness. Taking lead from these contributions, following hypothesis is considered:

H1. There exist significant differences of the level of emotional intelligence with variation of age, experience and designation of the correctional officers of West Bengal Correctional Service.

#### *3.2. Samples and Procedure*

The present research investigated how Perception of emotion, Managing own emotion, Managing emotion of others and Utilization of emotion of others of EI are associated with correctional officers' transformational leadership.

Sample Profile: Sample profiles with frequency distribution are shown in Table I.

#### *3.3. Data Collection*

Data were collected by means of structured close-ended questionnaires in a series of face-to- face interaction regarding their self-perceived emotional intelligence group wise with a gap of 15 days or more. Furthermore, in depth interview were conducted in order to collect some qualitative information from their comments and observations.

Age in Years	Designations														Total In number and in Percentage M / F
	Superintendent		Chief Controller		Welfare officer		Controller		Discipline Officer		Assistant controller		Probationary Officer		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
	32 14.3%	0	28 12.5 %	0	4 1.8%	12 5.4%	56 25%	4 1.8%	16 7.1%	0	52 23.2 %	4 1.8%	16 7.1%	0	204/20 94.6/5.4
26-30	0	0	6 2.8%	0	2 .08%	3 1.3%	9 4.0%	1 .04%	5 2.2%	0	24 10.1 %	0	2 .08%	0	48/ 4 23.2/1.8
31-35	0	0	2 .08%	0	1 .04%	8 3.6%	15 7.0%	1 .04%	1 .04%	0	15 7.0%	3 1.3%	2 .08%	0	36 /12 16.1/5.1
36-40	4 1.8%	0	0	0	1 .04%	1 .04%	22 9.8	2 .08%	0	0	5 2.2%	1 .04%	0	0	32 /4 14.3/1.8
41-45	10 4.5%	0	10 4.5%	0	0	0	10 4.5%	0	4 1.8%	0	0	0	6 2.8%	0	40/ 0 17.9/0
46-50	6 2.8%	0	4 1.8%	0	0	0	0	0	6	0	0	0	0	0	16/ 0 7.1/0
51-55	8 3.6%	0	4 1.8%	0	0	0	0	0	0	0	8 3.6%	0	4 1.8%	0	24/ 0 10.1/0
56-60	4 1.8%	0	2 .08%	0	0	0	0	0	0	0	0	0	2 .08%	0	8/ 0 3.6/0

Table 1: Sample Profile with Frequency Distribution of Sample (Sample Size, N=224, M=204, F=20)

3.4. Measurement

3.4.1. Emotional Intelligence (EI)

The selected components of supervisory EI (Perception of emotion, Managing own emotion, Managing emotion of others and Utilization of emotion) were measured with items adopted from widely used Schutte Emotional Intelligence Scale (SEIS) (1998) [29]. An important issue raised by Petrides and Furnham (2000) is whether this scale can be used in research as a face valid, unidimensional measure of EI in organizations. Investigating the psychometric properties of the SEIS would therefore help to answer this question [39].

The SEIS comprises 33 self-referencing statements and requires subjects to rate the extent to which they agree or disagree with each statement on a five-point scale (1 = strongly disagree; 5 = strongly agree) [10]. Participants, reply on a Likert scale and a total score is derived by summing up the item responses [39]. The brevity of the scale and its accumulating reliability and validity evidence makes this scale a reasonable choice for those that are seeking a brief self-report measure of global EI.

Initially an instrument was designed and filled out by group of supervisor (n =90). After completion the instructor initiated an item-by-item discussion. Critiques of the instrument were also received from two management faculty and other two faculties of industrial psychology. The items that were reported to be difficult, ambiguous, or inconsistent were either dropped or revised. A new item was added to compensate for the elimination of an item. Special attempts were made to make the items free from social desirability contamination. After each factor analysis, the items that loaded less than 0.50 and/or loaded on an uninterruptible factor were dropped or rephrased.

4. Results

To test the hypothesis, data analysis proceeded using SPSS

Exploratory factor analysis on the 33 EI items supported the four independent dimensions of EI. Factor loadings for all the domains range are 0.55 to 0.88. The internal consistency reliability coefficients of the four sub scales of the EI, as assessed with Cronbach  $\alpha$ , were also exhibit high internal consistency (range 0.482 to 0.789) (Table II).

Domains	Factor Loading	Cronbach $\alpha$
Perception Of Emotion (PE)	0.837	0.694
Managing Own Emotion (MO)	0.774	0.482
Managing Emotion Of Others (MOT)	0.876	0.639
Utilization Of Emotion (UT)	0.554	0.601
Emotional Intelligence (Overall) (EI)		0.789

Table 2: Factors Loading and Internal Consistency for Domains of Emotional Intelligence

Age wise variation of level of unit mean values for self perceived domains of emotional intelligence and overall emotional intelligence of correctional officers indicate above average ( $\geq 3.9$ ) for all the domains except utilization of emotion (UT) and which is high in nature. (Table III) It may be due to the fact that this particular job enforces an officer to utilize or manipulate the emotional aspects to overcome the daily problems and hazard coming out of the job context.

Age in Year	Mean Of the Domain of Emotional Intelligence				(EI)
	PE	MO	MOT	UT	
26 - 30	3.8	4.0	4.2	4.5	4.1
31 - 35	3.8	3.8	3.2	4.1	3.7
36 - 40	3.7	3.5	3.8	4.0	3.8
41 - 45	3.8	4.2	3.9	4.5	4.1
46 - 50	4.0	3.7	4.3	4.0	4.0
51 - 55	3.8	4.0	3.9	3.9	3.9
56 - 60	3.9	4.1	4.5	4.3	4.2

Table 3: Age Wise Variation of Mean Values for Domains of Emotional Intelligence

Experience wise variation of level of unit mean values for self perceived domains of emotional intelligence and overall emotional intelligence of correctional officers indicate that between the year of experience 11 years to 25 years these are high in nature (Table IV) It has generally seen that during this period of working life officers have to interact and take decision of their own and as a consequence receives maximum opportunities to deal with emotional intelligence in their working life.

Exp	Mean Of the Domain of Emotional Intelligence				EI
	PE	MO	MOT	UT	
1-5	3.8	3.9	4.2	3.9	3.9
6-10	3.5	3.7	3.9	4.1	3.8
11-15	3.9	4.5	4.5	4.2	4.3
16-20	4.2	4.2	4.1	3.9	4.1
21-25	4.2	3.7	4.4	4.5	4.2
26-30	3.5	4.3	3.9	3.8	3.9

Table 4: Experience Wise Variation of Mean Values for Domains of Emotional Intelligence

Designation wise variation of level of unit mean values for self perceived domains of emotional intelligence and overall emotional intelligence of correctional officers indicate that superintendent, controller and disciplinary officers perceive their level of emotional intelligence more than other categories of officers. Qualitative discussion with them also reveals the same as par the demand of their job. (Table V)

Designation	Mean Of the Domain of Emotional Intelligence				(EI)
	PE	MO	MOT	UT	
Superintendent	4.0	4.1	4.3	3.8	4.05
Chief Controller	3.6	3.7	4.1	3.8	3.8
Welfare officer	3.5	3.7	3.8	4.3	3.9
Controller	3.6	3.9	4.1	4.3	4.0
Discipline Officer	3.8	4.0	4.6	3.9	4.1
Assistant controller	3.8	3.9	4.1	3.9	3.9
Probationary Officer	3.8	3.6	4.0	4.2	3.9

Table 5: Designation Wise Variation of Mean Values for Domains of Emotional Intelligence

One way analysis of variance (F ratio) indicates that there exist significant variation of emotional intelligence and its domain due to variation of age, experience and designations of the correctional officers. (Table VI). It corroborates the reasons as indicated above (table III, IV and V).

Domains	F Ratio		
	Age	Experience	Designation
Perception Of Emotion (PE)	4.4*	5.7*	2.07
Managing Own Emotion (MO)	5.3*	6.5*	5.05*
Managing Emotion Of Others (MOT)	7.9*	4.3*	4.4*
Utilization Of Emotion (UT)	8.2*	0.94	4.6*
Emotional Intelligence (Overall) (EI)	6.5*	4.8*	4.0*

*Table 6: Significant Variation (F Ratio) Of Domains of Emotional Intelligence  
With Variation of Age, Experience and Designation  
\* Significant At 0.01 Level*

#### 4.1. Discussion

This study is an attempt to investigate the significant variation of Perception of emotion, Managing own emotion, Managing emotion of others and Utilization of emotion components of EI due to variation of the age, experience and designation of the correctional officers of West Bengal Correctional service. The study contributed to our understanding of the linkage that the perception of emotional intelligence significantly varies with variation of these factors (Table VI).

In order to understand the emotional processes and deal with them effectively, this kind of job, demand high utilization of emotions to control over the any risky and unsafe situation (table III).

Study also indicated that middle period of working life correctional officers nurture their or get opportunities to deal with emotional intelligence more than the junior one. Qualitative discussion reveals that seniors are so habituated with the situation they try to avoid any kind of confrontation in verge of their retirement from service life (Table IV).

It is coming from the data that the job of superintendent, controller and disciplinary officer's demand more fostering with the emotional intelligence and which also validated from qualitative discussion with the officers (Table V).

The implications of the study are that supervisors need to acquire and use their competencies on emotional intelligence in order to enhance their own leadership and improve team effectiveness regarding supervisor-subordinate interaction as well as relationships with inmates.

Appropriate interventions may be needed to enhance supervisors' emotional competencies that would involve positive reinforcements, education and specific job-related training. Moreover, organizations may have to adapt the policy of recruiting managers who are likely to be high on EI giving emphasis on team building.

#### 5. Scope for Further Study

- This study is limited by the domain of EI components.
- Apart from self perceived questionnaire there is a need to investigate through superior, subordinates and co worker
- Also it will be useful to investigate the differences in the perceptions regarding the leadership performance of managers with low and high EQ.

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## Performance of Textile Industry in Tamil Nadu: Perspectives of General Manager

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### **Abstract:**

*Textile industry is playing a vital role in the Indian economic growth of the country through its contribution towards GDP, employment, exchange rate, exports, total production etc. The purpose of the study is to identify the difficulties of textile companies facing challenges from the general manager's point of view on financial sustainability of selected textile companies. The study has used factor analysis for exploring various dimensions of barrier as well as weighted average method and other tests for selected measurement analyzes using SPSS-17 version for different statistics. Overall, the large scale companies performing very well with automatic plant with modern innovation products, medium scale unable to produce due to various reasons and impacting the growth and technological factors as well as facing various difficulties. It reflects overall textile issues and challenges as general results towards the structured questionnaires.*

**Key words:** Financial Performance, General Manager, Technological factors, and Textile Barriers

### **1. Introduction**

Indian textile industry is the second largest industry in the world next to China. It generates employment for more than 35 million people and excises collections nearly 9% and it contributes nearly 16% share of the country's export. About 27% of the country's foreign exchange comes from the textile exports. As per Apparel Export Promotion Council, this industry contributes nearly 3 to 4 percentages to GDP; Next to agricultural sector. Plus, it contributes nearly 14 percentage of the total industrial production of the country. Tamil Nadu is the eleventh largest state in India in term of area and the seventh most populous as well as the third largest India's GDP contributor (Porter and Niels). As per Census-2005, this states' economy largely depends on industries and agriculture. It has the highest number of business enterprises (10.56%) and stands second in total employment (9.97%) in India. Coimbatore is well known as Manchester of South India. Tirupur cluster itself is exporting 56% knitwear and 76% (Tex-City or Loom-City of India) India's total textile market from Erode cluster (Marimuthu and Jessica). Out of that, Coimbatore is contributing large number of textile companies' establishments and running very well with highest exports on both domestic and international market.

### **2. Problem of The Study**

Researcher has found a research gap through various literatures on textile industry facing many draw backs due to improper administration, growth factors, micro and macro factors that include investment decision and technological factors. In modern days, due to market fluctuation on the raw materials cost, import restrictions and less demand for export, unavailability of workers, highest cost yarn, cotton, lowest cost of competitor products with innovative, interest rate, exchange rate, etc. out of that external problems, there are many other internal problems that depend upon the company size, investment, plant location and machinery, infrastructure, innovative products etc.

### **3. Review of Literature**

Palani and Yasodha analyzed the various ratios towards working capital management on the loyal textile mills limited using for the last five years of statements. The study identified the good performance on the company through current and short term solvency ratios. The study suggested implementing proper collection methods from increasing collection period year after year and brings the collection period down using the operating cycle. Sushil Kharna concentrated on the technological development of textile industry from the year 1950s to 1980s. As a result of the second five year plan, bulk quantities of new generation modern machines have been imported. The major reason for this import was to meet the competition from the international market, which was based on high

quality of research and innovation. Late 1970s has witnessed higher import by the technical innovations such as modern technology machines, speed, quality cloth, labor and capital intensive technique and the range of alternative techniques etc. Bashar Matarnah study concludes with the SSI units are always running with low capital plus it always facing problem with WCM, current asset, shortage of raw material etc. without the government help very difficult to run with competition through support of financial institution co-operation Govinda and Gopinath concentrates on the excise duty evasion on intersect oral classification of yarn and cloth, direct taxes of India and evasion of commodity taxes. Sarika et.al analyses the factors responsible for the crisis and inducts the impact of global recession on the world economy in the way of GDP growth rate, interest rate, stock market, unemployment rate and the export sector. Downturn due to the result of sluggish industrial growth, inflation, current account deficit, foreign exchange reserve, and depreciation of rupee. Polpi & Rao discussed the requirement in technological up gradation, financial support system, policy procedure and practices of Indian government. Short and long term financial institution provides credit to the Indian textile SME unit. Further it also discusses the suggestions for improving the financial system in the Indian SME units. Alessandra and Amelia analyzed the link between export productivity, economic growth and financial development indicators with the help of 139 countries panel data from the period of 1992-2003. Further it investigated whether the links among China, India and Brazil systematically differ from other countries and highlights the main reason for the country's growth and productivity, not only volume of exports favoured by products with higher value-added and more technologically developed products. Venu & Haesun concentrate on technology adoption, influence on Indian apparel manufacturing firms and the affect of various technological (Anupkumar and Subhash) level of organizational factors like firm size, export orientation, top management commitment, cost of capital, technical skills and competitive advantage. The study found that there is a significant positive relation on various levels of firm size on technology adoption and negative relation on its export orientation. Young-A Le, et.al identified the characteristic strategies, specific perceived needs, and internal/external challenges of Michigan apparel and textile industry. It also identified six main needs of ratings scale on product development, organization development, technology, and communication, marketing and international trade, human resources and environmental issues and sustainability. Steve Toms found the rapid growth in the initial decade and terminal decline/end of twentieth century. Reason behind that; first given more preference on the variable like industry structure, profitability, capital accumulation, technological choice, associated wealth distributions etc. the study found that innovation are the main impact on the poor performance as well as wrong investment decisions, poor leadership, inappropriate industry structure of Lancashire entrepreneurs Vivekanandan & Rajendran investigated on World Wide Web export marketing and the empirical analyses of Tirupur knitwear apparel exporter's barriers. It could be said that psychological barriers are the biggest one among five types of factor analysis of export barriers. Abhijit and Kaivan analyzed the investment behaviour in the knitted garment industry in the south Indian town of Tirupur and focused on large and systematic differences in both levels of capital stock and the capital intensity of production in firms owned by two different community groups. It seems the two explanations based on imperfections in the credit market and in the market for second-hand machines fit the data much better. Parvinder and Sandip found the most influential factors as entrepreneur or managerial attributes on the Growth potential of the product's market, or projected returns and pricing or valuation of the portfolio company as well as found its strong correlation with regulatory and legal framework.

#### 4. Objectives of the Study

- To find out the factors influencing technological changes of the textile companies
- To identify the various growth and obstacles of the select textile companies

#### 5. Methodology

The study is mainly based on a primary data analysis of the field study through its sample on different places from Tamil Nadu. Out of 244 population of the sample (CMIE registered companies), the researcher collected data as pilot study from 40 companies from Chief-Executive Officer, researcher explained in this study about the CEO opinions towards textile company financial performance and analyzed using SPSS-17 version with different statistics.

#### 6. Analysis and Interpretations

##### 6.1. Demographical Factors of the Respondents

The researcher has analyzed the educational qualification of Chief Executive Officers/General Managers/Managing Director respondents from the textile industry. The respondents are classified in terms of many categories in demographical such as qualification according to their literacy level, size of the company, business type of organization, employees working strength in each organization as well as membership of the companies.

	Qualification		
	Frequency	Percent	Cumulative Percent
Below UG	2	5.0	5.0
UG Level	6	15.0	20.0
PG Level	30	75.0	95.0
Professional	2	5.0	100.0
Total	40	100.0	

Industry Type								
	Frequency		Percent		Cumulative Percent			
Large Scale	5		12.5		12.5			
Above Medium	35		87.5		100.0			
Total	40		100.0					
Business-Type of Organization								
Private	31		77.5		77.5			
Public	9		22.5		100.0			
Total	40		100.0					
Employees Working in Organization								
Below 50	1		2.5		2.5			
Between 50-100	15		37.5		40.0			
Between 100-500	16		40.0		80.0			
More than 500	8		20.0		100.0			
Total	40		100					
Textile Industry Members of any Association								
Industry Type	Medium Scale		Large Scale		Total			
Textile Association	Yes	No	Yes	No	Yes	No	%	%
SIMA	28	7	5	0	33	7	82.5	17.5
AEPC	30	5	5	0	35	5	87.5	12.5
SITRA	21	14	5	0	26	14	65	35
SIHMA	6	29	4	1	10	30	25	75
TEXPROCIL	4	31	1	4	5	35	12.5	87.5
EEPC	4	31	1	4	5	35	12.5	87.5
TEA	15	20	4	1	19	21	47.5	52.5
MSA	0	35	1	5	4	36	10	90

Table 1: Demographical Factors of CEO

The above table-1 highlights the qualification status facts, 30 respondents are PG and Diploma holders (75%). 6 respondents are under graduate level (15%), 2 (5%) respondents are from professional level and 2 (5) respondents are belongs to higher school level.

Out of 40 companies, 9 companies are public limited and accounts for 22.5 percent. 31 companies are private limited companies and accounts for 77.5 percent. The textile companies in Tamil Nadu are divided into large and medium scale industry. Out of 40 companies, large scale companies are around 5 (12.5 percent) and majority are from medium scale around 35 companies (87.5 percent). Textile industry depends on the machinery and modern innovations. Therefore, the number of employees have been reduced in the textile companies as they are replaced by machinery from the table-1, the above mentioned fact is very clear as below 50 employees are working in one company (2.5%), between 50 to 100 employees are working in 15 companies (37.5%), followed by 16 companies' (40%) employees are working between 100 to 500 plus, more than 500 employees are working in 8 companies (20%).

Every textile company is voluntarily joining as a member company in anyone of the associations or many associations regardless of size or market to promote their own products through information sharing and networking, research and bench marking etc. Out of 40, more than 33 companies are members in South Indian Mills Association[SIMA] (82.5%); out of these 33 companies, 28 companies are from medium scale and 5 companies are from large scale industry. 35 majority companies are members in Apparel Export Promotion Council[AEPC] (87.5%), out of 35 companies, 30 companies are from medium scale and 5 companies are from large scale companies, followed by 26 companies which are members in the South Indian Textile Research Association [SITRA] (65%), out of 26 companies, 21 companies are from medium scale and 14 companies are from large scale company category, followed by 19 companies are members under Tirupur Exporters Association[TEA] (47.5%) out of 19 companies, 15 companies are from medium scale and 4 companies are in large scale company, followed by 5 companies are members under The Cotton Textiles Export Promotion Council of India[TEXPROCIL] (12.5%) out of 5 companies, 4 companies are from medium scale and one company is from large scale company category, followed by 10 companies are members under the South Indian Hosiery Manufactures Association[SIHMA] as 25% includes 6 companies from medium scale and 4 companies from large scale company, continue by 12.5 percentages members in Engineering Export Promotion Council[EEPC] includes 4 companies from medium scale and one company from large scale and 10% are members in Madurai Spinners Association[MSA]. Further there are many other associations such as; Tamil Nadu Spinning Mills Association, Indian Textile Accessories & Machinery Manufacturer's Association, Indian Woolen Mill's Federation, The Textile Associations, Tamil Nadu Textile Merchants Associations Limited, The Clothing Manufacturers' Association of India etc.

### 6.2. Textile Industry Using the Technological Type

Textile industry manufacturers are producing the textile products without any machinery or technology. Year by year the changes happened through the entry of British, European and others introduced their own technology in India using the available Indian resources at various places. Textile manufacturing involves various processes- weaving, knitting, spinning, and dyeing machines. In

modern days, these textile materials were drawn from four main sources such as animal (wool, silk), plant (cotton, flax, jute), mineral (asbestos, glass fiber) and synthetics (nylon, polyester, acrylic).

Industry Type	Textile Technology			Total
	Semi-Automatic Machines	Automatic Machines	Manually Operating	
Large	0	5	0	5(12.5)
Medium	28	4	3	35(87.5)
	28 (70)	9 (22.5)	3 (7.5)	40(100)

Table 2: Textile Industry Using the Technological Type

These textile products are manufactured from different types of technology that includes technical textiles (industrial textiles, functional textiles, performance textiles, engineering textiles, invisible textiles and hi-tech textiles). From the above table-2, the semi-automatic machines are using majority of the textile industry (70 percent), because traditionally textile products are getting manufactured manually for many decades. Automatic machines (22.5%) are used by large scale company (around 5) and followed by 4 medium scales. 3 medium scale companies are still producing manually due to huge capital machine, infrastructure, and large amount of raw materials.

### 6.3. Financial Return Changes From Company Website

If once business is started in the market, it is essential to plan and tightly manage its financial performance. Meanwhile creating a budgeting process is the most successful way to keep business and its funds on track. At the same time, outside competitive market, compulsory to play a role better than other company should change the strategy and its communication growth and development, so it is easy to attract our order men's or buyers to collect all those details about company possess manufacturing products quality, price, materials, packaging etc. It is all as per marketing and advertisement playing a crucial role in foreign trade. But in financial management, through the contribution of communication development through website it is getting back high return on its financial changes.

	Frequency	Percent	Cumulative %
Didn't Expect	32	80.0	80.0
Expected next 2 years	2	5.0	85.0
Disappeared	1	2.5	87.5
Financial Return gained	5	12.5	100.0
Total	40	100.0	

Table 3: Financial Return of CEO Respondents

The above table-3 reflects the respondents, changes the financial return through operating website for the textile company future growth and development. Most of the companies (80%) did not expect the return from operating the website for the company. out of that, 12.5% of the companies are gained fully through operating company website and frequents update manners. Meanwhile, 5% of the companies are expecting good return/yield in the future from its recent operated company website as well as 2.5% of the companies are disappeared while modifying the company website for the better return and order.

### 6.4. Cross Tabulation between Industry Size and Technological Effect

The Indian textile industry intends to meet the domestic requirement, compounded with high cost raw material and investment pressure. Therefore, there is a need to upgrade the technology in times, replace old into new innovations etc.

Upgrading Technology in time in an organization						
	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Total
Large	4	1	0	0	0	5
Medium	22	11	0	2	0	35
	26(65)	12(30)	0	2(5)	0	40
New Technologies Appearing						
Large	2	3	0	0	0	5
Medium	7	24	4	0	0	35
	9(22.5)	27(67.5)	4(10)	0	0	40
Transferring Technologies into flexible substrates						
Large	3	0	2	0	0	5
Medium	2	6	26	1	0	35
	5(12.5)	6(15)	28(70)	1(2.5)	0	40

Replacing of traditional materials to modern textiles						
Large	2	1	2	0	0	5
Medium	1	23	10	1	0	35
	3(7.5)	24(60)	12(30)	1(2.5)	0	40
Non-Textile Materials						
Large	4	0	1	0	0	5
Medium	19	2	14	0	0	35
	23(57.5)	2(5)	15(37.5)	0	0	40

Table 4: Cross Tabulation between Industry Size and Technological Effect

From the above table-4, textile industry up-grading its technology in time positively agreed by majority of the respondents (95%) has agreed and 22 companies are strongly in favor of the up-gradation timing. Only few respondents are negatively responded on disagree (5%). Introducing the new technology in the market frequently responded positively around 90% have strongly agreed. Transferring technologies into flexible substrates by positively agreed near 27.5% only and majority of them are given the uncertain (70%) responds reflecting that they could not able to introduce and upgrade new technologies from the downtrodden loss situation due to huge funds requirement, capital operation etc. Meanwhile, market products are fully occupied by synthetic fibers and the producers also concentrating on those products like petrochemical based synthetic fibers and penetration by synthetic with low price. Companies are facing enormous internal and external challenges with regard to technical production, innovation strategy (Vivekanadhan & Rajendran, 2006), marketing, management, inadequate credit finance operations and expansions (Young, et al; Popli & Rao). Replacing the old into modern textiles roughly 67.5% of them positively responded, whatever may be there is a negative reply about 2.5% and moderate near 30%. Modern textile products are introducing the non-textile materials such as; Non-Textile Fiber (A fiber which is not employed in the manufacture of textiles), nonwoven fabric (applications like medical, filters, geo-textiles and others). Out of that, non-textile materials usage gives a positive answer about 62.5% as well as 37.5% from uncertain reply shimmering that not using those non-textile materials for products.

#### 6.5. Technological Changes Fulfillment of Textile Companies

Textile Company always should face/challenge or fulfill the innovation on technological products in the market demand, better quality, focusing on sustainability etc. Meanwhile should identity by the opportunity to launch their own technical products in this industry complex undergoing rapid market and global competitive changes.

Fulfilling on	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Total Score	WAS (Rank)
Addressing the issues on Security and Privacy	7(17.5)	31(77.5)	2(5)	-	-	165	4.13(II)
Responding to the need to have qualified and competent personnel	1(2.5)	10(25)	20(50)	9(22.5)	-	123	3.08(III)
Responding to the need for up gradation new innovation	13(32.5)	20(50)	6(15)	1(2.5)	-	165	4.13(I)
By handling the New Organization well	-	13(32.5)	14(35)	12(30)	1(2.5)	119	2.98(IV)

Table 5: Weighted Average Method on Management Fulfillment for the Technological Changes

The above table-5 reveals that textile company requirement, in what way fulfilling by the management to meet the challenges through four options. An analysis of the responses shown in Table explains that agree plus strongly agree is positive and disagree plus strongly disagree is negative as well as uncertain will tell the neither positive nor negative responses. out of 40 respondents, a vast majority of respondents (82.5%) have responded positively for the up gradation of new innovation in textile industry with WAS of 4.13 (Score: 165), out of that 82.5%, 50% of them agreed and 32.5% of them strongly agreed, continue by 15% of them uncertain decision follow by 2.5% of them disagreed for this innovation of technological changes. 95% fulfillment through addressing the issues on security and privacy with weighted average score (WAS) of 4.13 (Score: 165), out of 95%, positively agreed by 77.5% and 17.5% of them strongly agreed and only 5% of the respondents found to be uncertain in the textile industry requirements. When asked about different opinion of company managers related to technological changes in the management i.e. 27.5% with WAS of 3.08 (Score: 123) found to appoint a new qualified and competent personnel for respond the managerial tackling issues. Out of which only 2.5% of the respondents have strongly agreed to new personnel to take care issues and 50% of the respondents have opted uncertain on the decision. 22.5% of the respondents have disagreed on this personnel competent appointment for the development of company technological changes. 32.5 of respondents have positively agreed to the technological changes of textile industry management through handling the new organization well with WAS of 2.98 (Score: 119), whereas 35% of respondents have given uncertain. 30% of them disagreed followed by 2.5% of them strongly disagreed on handling the new organization well.

#### 6.6. Factors Determining the Growth of Textile Business

Industries experience cycles of economic growth and contraction based on many factors. Out of that, textile industrial factors are of two types- internal factors and external factors. Internal will discuss the variables related to factors impacting within

the industry and the factors impacting from the external reasons on industry growth called as external factors. Those external factors are through government side policy and programmes, providing business opportunities, export subsidies, support of financial institutions supporting from the textile associations in various types of prospect, government providing the opportunities to develop the new industry for that new organization many initiatives steps, meanwhile the industry agreement with the foreign orders with different contract and its changes negative or positive through volatility of currency between countries, simultaneously the competitions with our competitor products in the market includes the advance machinery information exchanges between the countries. Further research is also necessary to establish factors leading to lack of technological drive and the textile research journals and magazine to strategize in their marketing programmes for profit and growth

	<b>Very Highly Influenced</b>	<b>Highly Influenced</b>	<b>Moderate</b>	<b>Low influenced</b>	<b>Very Low influenced</b>	<b>Total Score</b>	<b>WAS (Rank)</b>
Government policy and programmes	4 (10)	13 (32.5)	22 (55)	1 (2.5)	-	140	3.50 (V)
Private Sector Initiatives	10 (25)	20 (50)	7 (17.5)	3 (7.5)	-	157	3.93 (III)
Level of Competition	32 (80)	8 (20)	-	-	-	192	4.80 (I)
Healthy Climate for Business Opportunities	8 (20)	31 (77.5)	-	1 (2.5)	-	166	4.15 (II)
Support from Financial Institutions	1 (2.5)	4 (10)	25 (62.5)	10 (25)	-	116	2.90 (VIII)
Export Opportunities	2 (5)	15 (37.5)	11 (27.5)	11 (27.5)	1 (2.5)	126	3.15 (VI)
Textile Organizations	2 (5)	4 (5)	17 (42.5)	10 (25)	2 (5)	99	2.83 (IX)
Textile related Journals Magazine CDs	3 (7.5)	14 (35)	5 (12.5)	14 (35)	4 (10)	118	2.95 (VII)
Textile Technology Information	11 (27.5)	9 (22.5)	16 (40)	3 (7.5)	1 (2.5)	146	3.65 (IV)
Nature of Contract	1 (2.5)	4 (10)	11 (27.5)	16 (40)	8 (20)	94	2.35 (X)

*Table 6: Weighted Average Method of Factors Determining the Growth of Textile Industry*

Weighted Average Method analysis shown in Table-6 explains that out of 40 respondents, a vast majority of the respondents (100%) are found that the level of competition to be influenced more on the factors determine the growth of textile companies with weighted average score (WAS-192) of 4.80. When asked different factor measures related textile growth, a considerable number of managers i.e. 97.5% with WAS of 4.15 found the second most positive influence factor of healthy climate for business opportunities, Only one respondent was found to be low influenced on growth due to healthy climate and it is not helped for the business opportunities. Followed by 75% of managers have agreed that the growth factor highly influenced through private sector initiatives with WAS of 3.93, whereas 17.5% given moderate answer, only 7.5% of the respondents found the low influence of private sector enterprise. Regarding Government policy and programmes factors 42.5% respondents with WAS of 3.50 were found to be the high influence on growth of textile business whereas 55% respondents have answered moderate like one side government policy frequent changes helping to their growth and opposite side drawback through export products and import raw materials plus in other ways also, only 2.5% respondents have given low influence of this measure on their business. Majority 50% respondents with WAS of 3.65 were considered to be high influence though this technology on growth factor measure, there is a positive as well as negative impact through technology up gradation information. But again there were 7.5% respondents are low influenced follow by 2.5% are very low influenced on this factor measures.

#### *6.7. Modern Factors Influencing On Technology Adoption*

Modern technological products are highly reflecting the foreign textile products and India is unable to compete with them in international products and struggling with that below machinery equipments showed in the table.

	Frequently	Often	Sometimes	Rarely	Never	Total Score	WAS
CAD	35(87.5)	5(12.5)	-	-	-	195	4.88 (VIII)
AI	35(87.5)	5(12.5)	-	-	-	195	4.88 (IX)
AMHD	38(95)	2(5)	-	-	-	198	4.95 (II)
NCMT	38(95)	1(2.5)	1(2.5)	-	-	197	4.93 (V)
SPC	39(97.5)	-	1(2.5)	-	-	198	4.95 (III)
PPIC	35(87.5)	5(12.5)	-	-	-	195	4.88 (X)
LAN	40(100)	-	-	-	-	200	5.00 (I)
PPR	31(77.5)	7(17.5)	2(5)	-	-	189	4.73 (XI)
HSSM	38(95)	1(2.5)	1(2.5)	-	-	197	4.93 (VI)
MFPM	39(97.5)	-	1(2.5)	-	-	198	4.95 (IV)
CUFF	38(95)	1(2.5)	1(2.5)	-	-	197	4.93 (VII)

Table 7: Weighted Average Method on Modern Factors Influencing On Technology Adoption

The above weighted average method analysis table-4.14 reflects that most of the modern factors are highly influencing on the technology adoption of a firm. The research found that 100% high influence of local area network on technology adoption with WAS of 5, followed by 97% of the respondents found that Automated Material Handling Devices frequent influences with WAS of 4.95, next most Statistical Process Control as 97.5% influencing frequently with the WAS of 4.95 followed by Modern Fusing and Processing Machine most influences around 97.5% as frequently with the WAS of 4.95. Out of that, 2.5% are said that sometimes only it is influencing. 97.5% told it is most influencing from Numerical Control Machine Tools as frequently (95%) and often (2.5%) with the WAS of 4.93. Only 2.5% found less influencing as sometimes. High Speed Sewing Machines is the next most influencing variable near 97.5% as frequently (95%) and often (2.5%). 2.5% are less influencing as sometimes with the WAS of 4.93, followed by Computers Used on Factory Floor (WAS-4.93), Computer Aided Design (WAS-4.88), Automated Inspection (WAS-4.88), Production Planning/Inventory Management Software (WAS-4.88), Pick/Place Robots (WAS-4.73).

#### 6.8. Factor Analysis of Textile Industry Barriers

The KMO Measure of Sampling Adequacy (0.575) and the Bartlett's test of sphericity ( $p < 0.000$ ) indicated that factor analysis could be useful. In total, there were 26 items in the data. Kaiser-Meyer-Olkin Measure of Sampling Adequacy varies between 0 and 1, and values closer to 1 are better. A value of 0.6 is suggested minimum. However, 4 items removed with higher cross loading as well as below 0.4 (more than 0.20) extracted and one variable is reproduced with rotated factor matrix and once again repeated one item with huge variance in that cross loading is extracted.

Kaiser-Meyer-Olkin Measure Of Sampling Adequacy.		.575
Bartlett's Test of Sphericity	Approx. Chi-Square	704.726
	df	231
	Sig.	.000

Table 8: KMO and Bartlett's Test

Using the Principal Component Analysis five factors have been extracted based on the variance (Eigen Value greater than 1). The variance explained by the initial solution, extracted components, next used varimax rotation and rotated components are displayed in table.

Total	% of Variance	Cumulative %
4.510	20.499	20.499
4.190	19.047	39.546
3.517	15.987	55.533
1.997	9.076	64.609
1.407	6.397	71.006

Table 9: Extraction Sums of Squared Loadings

Extraction Method: Principal Component Analysis

The five factors extracted together account for 71.006% of the total variance (information contained in the last rotation with 22 variables). On the extraction initially, factor one is able to explain 20.499% of variance, factor two explains 19.047%, follow by factor three 15.987%, follow by factor four 9.076% and five explains 6.397%.

Factors	Variables	Component				
		1	2	3	4	5
Regulatory / Fiscal Policy Factors	Lack of assistance from Govt. and agencies	.949				
	Lack of Govt. policy issues and regulatory bodies	.947				
	Lack of Clear Regulations	.828				
	Lack of Sources of Technical Assistance	.814				
	Lack of Guidance and Council	.670				
Power and Material Risk	Price Volatility of Raw material		.894			
	Power Problem		.847			
	Unreliable Suppliers		.643			
Internal Barriers	Workers Shortage			.910		
	Too Many Competitors			.734		
	Lack of Distribution Channels			.675		
	Entry level financial requirements			.596		
	Bearing the Entire Risk			.503		
External Barriers	Extension of Credit from Suppliers				.850	
	Global Competition				.716	
	Low demand due to high prices textile products				.689	
	Lack of Entrepreneurial understanding				.661	
	Manufacturing Costs				.573	
	Location of the Firm				.499	
Export Barriers	Identification of Export Opportunities					.722
	Textile Insurance Scheme					.640
	Obtaining a Loan, Insufficient facilities and subsidies					.494

Table 10: Textile Barriers

Factor analysis technique helps to reduce the number of variables and to detect structure in the relationships between variables. The above 22 variables have high loadings on factor one. This suggests that factor 1 is a combination of 5 variables in the name of "regulation fiscal policy factor," Second factor is the combination of 3 variables with the medium loadings; the factor can be called as "Power and Material Risk Factor." Third factor is the combination of 5 variables with the high loadings; the factor can be called as "Internal Barriers." Fourth factor is combination of 6 variables with the medium loadings and factor can be called as "External Barriers." The last factor is the combination of 3 three variables and factor can be called as "Export Barriers." Results show that from the 26 variables extracted into 22 variables in the data have been reduced to five factors and each factor has given a name.

## 7. Findings and Conclusion

From the demographical factors, out of 40 respondents, 75% of the respondents are qualified at PG level; most of the companies belong to private ownership and member in AEPC, SIMA, SITRA, and TEA. 28% of the companies are still following the semi-automatic machines plus 7.5% of them manually operating and not fully established as modern machinery. Due to this reason, Textile Company is unable to meet foreign competitors in the market. 32% of the companies didn't expect company website to enlarge company performance. The contribution of communication development through website it is getting back high return on its financial changes. So, company must concentrate many other way also. It is found that companies should more consider the fulfillment of the innovation on technological products in the market demand, better quality, focusing on sustainability etc. Weighted average method suggests that competition is the main important factor on the growth of textile companies as well as Local Area Network is modern main impact factor of the textile technological factors. Factor analysis has found five factors from the variables of textile barriers. Out of that, regulation fiscal policy factor is more impact factor through its high load variance on textile organization performance. So that, the state and central government should make changes on regulations as per textile industry requirements to overtake those barriers as well as provide the proper fiscal monetary funds, improve the technical assistance, increase technological up-gradation fund scheme etc. Overall, the large scale companies are performing very well with automatic plant with modern innovation products, medium scale unable to produce due to many above reasons and impacting the growth and technological factors as well as facing various difficulties. So, Indian government should make changes as per the requirement of the textile companies association research output plus provide the low price materials, control the import and export favorable to the domestic market.

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## Transformational and Transactional Leadership in the Indian Context

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### **Abstract:**

*This study examines the dimensionality of transformational and transactional leadership posited by Bass [1] and their role in explaining select outcome variables and employee attitudes in the Indian context. Data was collected from a sample of 255 employees from a large multinational organization in India, using Multifactor leadership Questionnaire (MLQ 5x) [2] [3]. Results show that transformational and transactional leadership are linked with extra effort, effectiveness of the leader, satisfaction with the leader and turnover intentions. Results of hierarchical regression analysis reveal that significant proportion of extra variance in outcome variables is explained only by transformational leadership. This study finds support for two-factor Active-Passive model of leadership and provides an empirical support to the transformational and transactional leadership model in the Indian context.*

**Key words:** Transformational leadership, transactional leadership, active leadership, passive leadership, leader effectiveness

### **1. Introduction**

In the modern day's context of dynamic change and turbulence, transformational leadership is found to be highly effective in a wide range of organizational contexts. Burns [4] introduced the concepts of transforming and transactional leadership in his treatment of political leadership. Extending the theory of Burns, Bass [1] conceptualized an integrated theory of leadership using transformational instead of transforming and proposed that transformational leaders arouse and transform the attitudes, beliefs and motives of followers to a higher level, acting as change agents. Transactional leaders, in contrast, focus on exchange of resources for valued outcomes. According to Bass, transformational and transactional leaders are distinct but not mutually exclusive; the best leaders are both transformational and transactional. The theory of Bass [1] underwent several revisions and evolved into Full-range leadership theory (FRLT) [5] [6]. Based on the concepts of transformational leadership, transactional leadership and non-leadership, Bass and Avolio [2] [3] developed Multifactor Leadership Questionnaire to measure leadership dimensions and outcomes.

### **2. Objectives and Hypothesis**

Leadership research has evidenced the efficacy of transformational leadership in the canvass of dynamic business landscape. As indicated by research, securing and retaining human resources remains a potent issue in the current business environmental context and that transformational leadership may trigger the development of intellectual capital needed to meet organizational challenges [7] [8] [9] [10] and [11]. Many studies indicate that transformational leadership results in greater leader effectiveness and subordinate satisfaction than other leadership styles [12]. Studies also show that the enhancement of subordinates' satisfaction and trust in leadership resulted in lower employee turnover [9], higher group performance levels [13], and enhanced efforts by subordinates [14]. Systematic attempts to study the transformational and transactional leadership model of Bass [1] in the Indian context are sparse. This study examines the relationship of transformational and transactional leadership dimensions with select outcome variables in Indian context. Accordingly the following hypotheses were formulated and empirically examined:

- Hypothesis-1(a): Transformational leadership will have positive relationships with extra effort of the follower, effectiveness of the leader and follower satisfaction with the leader and negative relationship with turnover intention (intention to quit) of follower.

- Hypothesis-1(b): All the four dimensions of transformational leadership will have positive relationships with extra effort of the follower, effectiveness of the leader and follower satisfaction with the leader and negative relationship with turnover intention (intention to quit) of follower.
- Further objective of this study was to assess the relative importance of leadership variables in explaining select outcome variables in the Indian context. Accordingly the following hypothesis was formulated and tested:
- Hypothesis-2: Transformational leadership will significantly predict leadership criteria (extra effort, effectiveness of leader, satisfaction with the leader) controlling for the transactional leadership.
- Another objective of this study was to examine the dimensionality of transformational and transactional leadership in the Indian context since a two factor solution – active and passive leadership – was already referred in some earlier studies. Thus the following hypothesis was tested:
- Hypothesis-3: Active leadership will significantly predict leadership outcome variables (extra effort, effectiveness of leader, and satisfaction with the leader) controlling for passive leadership.

### 3. Methods

Data for this study was collected from a large technology based multinational organization located at Bangalore, operating in India for over two decades with certifications of ISO 20000; CMM ® 27001; ISO 14001; SAS 70 and People CMM ® for its Indian operations.

#### 3.1. Sample and Procedures

Respondents in the sample were selected predominantly on convenience method of sampling though care was taken to include respondents from major divisions of the company. Data was collected from 255 employees working in different divisions of the organization. The sample consisted of 141 male and 114 female respondents with an average age of 26 years and average work experience of 3 years and 8 months. This study satisfied the rules proposed by Thorndike [14] with regard to the sample size.

#### 3.2. Measures

##### 3.2.1. Leadership Dimensions and Outcome Variables

The Multifactor Leadership Questionnaire (MLQ 5x-Short) developed by Bass and Avolio [2] [3] consisting of 45 items measuring transformational leadership, transactional leadership and leadership outcome variables, was used in this study. The MLQ captures four dimensions of transformational leadership: Idealized Influence, Inspirational Motivation, Intellectual Stimulation, and Individualized consideration; three components of transactional leadership: Contingent Reward, Management-by-Exception-Active, and Management-by-Exception-Passive; and a non-leadership dimension – Laissez-faire leadership – in 36 items. The outcome variables: Extra Effort, of the follower, Effectiveness of the leader, and Satisfaction with the leader, are measured by nine items in the questionnaire. Reliabilities for each leadership factor scale ranged from 0.74 to 0.94. Reliabilities for all the scales exceeded the standard cut-offs for internal consistency recommended in literature [3]. The Cronbach alpha reliability coefficients reported in this study are: 0.91 for the overall transformational leadership scale and ranged between 0.67 and 0.80 for transactional leadership, and 0.77 for laissez-faire leadership.

##### 3.2.2. Intention to Quit Dimension

Turnover intention of employees was measured by a three-item seven-point scale developed by Camman, Fichman, Jenkins and Klesh [15]. This study reported a Cronbach alpha reliability coefficient of 0.87 for this scale.

#### 3.3. Data Analysis

The reliability of instruments used in this study was assessed by the Cronbach alpha coefficient of internal consistency. Exploratory factor analysis was carried out to understand the dimensionality of leadership constructs. Correlation and regression analysis were used to study the relationships between variables. Hierarchical regression analyses were used to examine the augmentation effects of transformational and transactional leadership.

### 4. Results and Discussion

#### 4.1. Leadership Dimensions and Their Relationships

Correlations between eight leadership dimensions, their reliabilities and descriptive statistics are given in table-1.

All the transformational leadership factors and two factors of transactional leadership (contingent reward and management-by-exception-active) were significantly ( $p < 0.01$ ) correlated with each other.

Sl.	Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1.	Idealized Influence	2.60	0.74	(0.80)									
2.	Inspirational Motivation	2.75	0.77	0.79**	(0.72)								
3.	Intellectual Stimulation	2.57	0.75	0.75**	0.64**	(0.65)							
4.	Individual Consideration	2.48	0.84	0.77**	0.63**	0.71**	(0.68)						
5.	Transformational Leadership	2.60	0.69	0.93**	0.86**	0.87**	0.88**	(0.91)					
6.	Contingent Reward	2.64	0.80	0.80**	0.72**	0.70**	0.71**	0.83**	(0.72)				
7.	Management-by-Exception (Active)	2.66	0.76	0.55**	0.54**	0.45**	0.44**	0.56**	0.54**	(0.62)			
8.	Management-by-Exception (Passive)	1.66	0.94	-0.07	-0.13*	-0.09	-0.07	-0.10	-0.04	0.06	(0.66)		
9.	Transactional Leadership	2.32	0.56	0.60**	0.52**	0.49**	0.50**	0.59**	0.70**	0.74**	0.58**	(0.58)	
10.	Laissez-faire Leadership	1.38	1.07	-0.19**	-	-0.19**	-0.21**	-0.23**	-0.19**	0.01	0.69**	0.30**	(0.78)

Table 1: Descriptive Statistics, Reliabilities and Correlations for Leadership Variables

# Cronbach Alpha Reliabilities Are Reported In Parentheses along the Diagonal.

\*\*  $P < .01$

Management-by-exception-passive was positively correlated only with laissez-faire leadership. Laissez-faire leadership was positively correlated with the overall transactional leadership and had a significant ( $p < 0.01$ ) negative correlation with all the factors of transformational leadership and also with contingent reward dimension of transactional leadership while it was not correlated with management-by-exception-active. The reliability of all the sub-constructs is also between medium to high (0.62 to 0.80). The correlation coefficients among the components of transformational leadership were in the range of 0.63 to 0.79 and all the four dimensions clubbed together forming a measure of transformational leadership had an overall reliability coefficient of 0.91. Similarly the overall transactional leadership dimensions clubbed together had a combined reliability coefficient of 0.58. The reason for the reliability coefficient not being high for transactional leadership could be that, the management-by-exception-passive dimension is not significantly correlated with the other two dimensions – contingent reward and management-by-exception-active which provides an indication towards two factor model discussed in hypothesis 3.

#### 4.2. Exploratory Factor Analysis Of Leadership Variables

One of the objectives of this study was to examine the dimensionality of transformational and transactional leadership in the Indian context and accordingly hypothesis-2 was formulated and tested. An exploratory factor analysis of the scores of all dimensions of transformational and transactional leadership was conducted to examine the factors underlying these eight dimensions. In the common factor analysis only 2 factors had latent root or eigen value greater than 1. A screen test [16] was conducted since the latent root criterion generally results in conservative estimate of the number of factors to be extracted in the case of common factor analysis in comparison with principal component analysis. Screen test is a procedure in which latent roots are plotted against the number of factors in their order of extraction, and the point at which the curve first begins to straighten out, giving the maximum number of factors to extract [17]. Two factors were extracted out of the eight dimensions from the common factor analysis. An absolute value of 0.30 is generally considered to be the minimum factor loading for interpretation [18]. Out of the eight dimensions, six dimensions (idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, contingent reward and management-by-exception-active) had a factor loading greater than 0.69 on the first factor. Five dimensions had factor loadings of 0.83 to 0.93 on first factor and one dimension (management-by-exception-active) had a loading of 0.69 on the first factor. Two dimensions (management-by-exception-passive, and laissez-faire leadership) had factor loadings of 0.92 and 0.91 on factor 2 and less than 0.20 loadings on factor one. After varimax rotation, the two factors that emerged were labeled based on the content analysis of the dimensions and findings of earlier studies [19] [20] [21]. The first factor consisting of six dimensions (idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, contingent reward, and management-by-exception-active) was termed as active leadership.

The second factor, which consisted of two dimensions (management-by-exception-passive, and laissez-faire leadership) was termed as passive leadership. These two factors (active leadership and passive leadership) were used to examine their relations with outcome variables and also to test the augmentation hypothesis.

#### 4.3. Leadership Dimensions and Outcome Variables

The correlations between eight leadership dimensions, active-passive leadership and outcome variables of extra effort, effectiveness of the leader, satisfaction with the leader, and intention to quit are provided in table-2 below:

Leadership Variables	Extra Effort	Effectiveness of the Leader	Satisfaction with the Leader	Intention to Quit
Transformational Leadership	0.71**	0.79**	0.75**	-0.16*
Idealized Influence	0.66**	0.75**	0.72**	-0.08
Inspirational Motivation	0.59**	0.72**	0.66**	-0.10
Intellectual Stimulation	0.61**	0.64**	0.62**	-0.16**
Individual Consideration	0.65**	0.68**	0.67**	-0.21**
Transactional Leadership	0.42**	0.50**	0.41**	0.05
Contingent Reward	0.65**	0.74**	0.66**	-0.15*
Management-by-Exception (Active)	0.46**	0.56**	0.44**	-0.03
Management-by-Exception (Passive)	-0.18**	-0.19**	-0.19**	0.24**
Laissez-faire Leadership	-0.30**	-0.29**	-0.27**	0.25**
Active Leadership	0.72**	0.81**	0.75**	-0.15*
Passive Leadership	-0.27**	-0.27**	-0.25**	0.26**

Table 2: Correlations of Leadership Variables with Leadership Outcome Variables

\*\*  $P < .01$ . \*  $P < .05$

Transformational leadership was significantly ( $p < 0.01$ ) correlated with extra effort, effectiveness of the leader and satisfaction with the leader. All the factors of transformational leadership were significantly ( $p < 0.01$ ) correlated with extra effort, effectiveness of the leader and satisfaction with the leader. From these results it can be seen that hypotheses 1(a) and 1(b) are accepted.

#### 4.4. Relative Importance of Leadership Variables

Hierarchical regression analysis was conducted to test the hypothesis that transformational leadership accounts for a greater proportion of variance in outcome variables. In the first analysis, transactional leadership was entered as predictor in step-1 and transformational leadership in step 2. In the second analysis, the order of entry was reversed. The changes in  $R^2$  at each step are presented in table-3. Transactional leadership accounted for 17, 25, and 17 percent of the variance in the three leadership outcomes – extra effort, effectiveness of the leader, and satisfaction with the leader respectively – when entered first, and accounted for no additional percent of variance for all the three outcome variables when entered second. Transformational leadership accounted for 50, 62 and 57 percent of the variance in the three leadership effectiveness criteria of extra effort, effectiveness of the leader and satisfaction with the leader, respectively when entered first, and accounted for an additional 33, 37 and 41 percent of the variance respectively, when entered second.



## 5. Conclusion

This study supports the linkage of leadership constructs with extra effort of the followers, their perception of effectiveness of their leader, satisfaction with the leader and their turnover intentions. Results reveal that extra variance in outcomes is explained only by transformational leadership. The relevance of transformational leadership and contingent reward dimension of transactional leadership in influencing employee attitudes and effort is supported. The inspiration, concern and guidance received by employees from their superior are found to be important determinants of their satisfaction, effort and commitment to the organization. This study establishes the importance of transformational leadership in crucial employee attitudes as well as their turnover intentions, suggesting that two factor model of leadership may provide a better and comprehensive understanding of its variability. These contributions have important implications for practice and value addition to leadership literature.

## 6. Limitations of the Study

An important limitation of this study is the cross-sectional design, which does not examine causal relationships. The use of correlational design does not answer the question of causality between leadership factors and the outcome variables. Participation in this study was voluntary and so there might have been some self-selection bias. The single organizational context in which the hypothesized relationships were examined permitted the control of cross-industry and cross-firm variance but limited the generalizability of findings. This study included only the MLQ dimensions of transformational and transactional leadership of Bass and associates, and therefore limited the possibility of getting a totally different factor structure underlying transformational and transactional leadership in the Indian Context.

## 7. Directions for Future Research

Further research with a wider sample may provide greater support for a culture-specific model of leadership and could help to identify and train transformational leaders in the Indian context. A longitudinal research might assess the causal relationships. Efforts may be made to identify leadership dimensions in the Indian context, instead of applying the MLQ dimensions of transformational and transactional leadership identified by Bass and associates.

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## Performance Analysis of AODV Routing Protocol under the Different Attacks Through The Use Of OPNET Simulator

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### **Abstract:**

Security is always an important issue especially for the case of Mobile Ad Hoc Network (MANET) because the structure of the network makes it easier target for attackers. It can also be observed that the each type of attack affects the network characteristics differently hence a careful observation & analysis of network characteristics could describe the state of the network such as network is under specific attack or operating normally. Our work is performed in two parts in first part we simulated the network model under different attack using network simulator and during simulation we collected the network characteristics data such as packet drop rate, average number of hops per route, maximum end to end delay etc.. In the second part of our work the collected data is used for training of PNN which finally used for attack classification or detection. The simulation results shows that by selecting effective characteristics and proper training the detection rate up to 90% is achievable.

**Key words:** MANET, PNN, Intrusion Detection System

### **1. Introduction**

The Mobile Ad Hoc Network (MANET) is designed for easier establishment on network without any infrastructure but making design like this also exposed it to network attackers and makes it a soft target for intruder hence extra care is required to be taken. Now to overcome these problems many techniques are proposed one most common is the modification in the protocol (since initially it is designed by considering the performance). Generally the modification in the protocol works for specific attacks only and it may affect the performance also. Another problem with protocol modification is all nodes operating in that network must have same protocol or modifications must be compatible with standard one. Another approach which can work independently on any specific node or even on a separate observer unit is generally known as Intrusion Detection System (IDS). An intrusion detection system (IDS) is a device or software application that monitors network or system activities for malicious activities or policy violations and produces reports to a Management Station. Although the IDS do not counter the attack but it can generate alarm. The analysis shows that both systems have their own limitations but a better system can be designed by combining the both algorithms the IDS system can used to initiates the specific modification in protocol and this could be the complete solution for the intrusion detection and prevention system (IDPS).

### **2. Related Work**

Because of the importance of the subject already some work has been done some of them which are found most related and useful for making this paper is presented here. Bing Wu, Jianmin Chen, Jie Wu and Mihaela Cardei [1] presented great literature on the MANET attacks. Their work gives the detailed explanation of different attacks their behavior and their effect on network characteristics they also explained the security mechanism for some attacks although no simulation and mathematical details are provided. Another text on same topic is presented by Abhay Kumar Raiet.al. [2]. the simulation and modeling of the different attacks on MANET using network simulator is explained in [3] the paper also discussed the protocols and their immunities to different attacks with analytical modeling and mathematical formulation. Farah Jemili et.al. [4] Presented the intrusion detection system based on Bayesian Network (BN). The BN is used to build automatic intrusion detection system based on signature recognition. The goal is to recognize signatures of known attacks, match the observed behavior with those known signatures, and signal intrusion when there is a match. Improved Support Vector Machine(SVM) based IDS model is presented in [5]the paper discussed the method for improvement of SVM to achieve the

higher accuracy. A data pre processing and removal of similar data to reduce the training data size using k means clustering presented in [6] which shows significant improvement in training time with maintaining accuracy. One important requirement of classification is parameter selection because some of the features may be redundant or with a little contribution to the detection process. Gholam Reza Zargar and PeymanKabiri [7] investigate selection of effective network parameters for detecting network intrusions. The study shows that the major difficulty in develop the system like presented in [5][6][7] is that intrusions signatures changes broadly hence a large training dataset, parameter selection, data filtering and optimal classification is required. Besides mentioned limitation it has a great advantage of better classification without affecting the network performance.

### **3. Routing Protocol**

Mobile Ad Hoc Network (MANET) is collection of multi-hop wireless mobile nodes that communicate with each other without centralized control or established infrastructure. The wireless links in this network are highly error prone and can go down frequently due to mobility of nodes, interference and less infrastructure. Therefore, routing in MANET is a critical task due to highly dynamic environment. In recent years, several routing protocols have been proposed for mobile ad hoc networks and prominent among them are DSR, AODV. This research paper provides an overview of these protocols by presenting their characteristics, functionality, benefits and limitations and then makes their comparative analysis so to analyze their performance. The objective is to make observations about how the performance of these protocols can be improved. There is various type of routing protocol. These are following AODV, OLSR, DSR, and ZRP. [11].

#### *3.1. AODV Routing Protocol*

It provide fast efficient route establishment between mobile nodes that need to communicate with each other. Since AODV has been specifically designed for Ad Hoc wireless network. In addition to unicast routing, AODV support multicast and broadcast as well. AODV can be extended to support Quality of Services (QoS). AODV is an on demand algorithm, which means that routes between nodes are built only when means they are requested by originator nodes. Routes are maintained only as long as originator need then.

#### *3.2. OLSR Routing Protocol*

This protocol is based on link state algorithm and it is proactive (or table- driven) in nature. It employs periodic exchange of message to maintain topology information of the network at each node. OLSR is an optimization over a pure link state protocol as it compact the size of information sent in the message and furthermore reduces the number of retransmission to flood these messages in entire network. This protocol uses the multipoint broadcasting (relaying) tech to efficient and economically flood its control message.

#### *3.3. DSR Routing Protocol*

DSR routing protocol, which are used fir efficient routing under different scenario in MANET, which play a critical role in place where wired network are neither available nor economical to deploy. DSR allows the network to be complete self organization and self configure, without the need for any existing network infrastructure or administration. The protocol composed of two mechanism of route discovery and route maintain which work together to allow nodes to discover and maintain source route to arbitrary in the ad hoc network.[13]

#### *3.4. ZRP Routing Protocol*

ZRP is a well known hybrid routing protocol that is most suitable for large scale network. The ZRP framework is designed to provide a balance between the contrasting proactive and reactive routing approaches. its name is derived from the use of one that define the transmission radius for every participating node ZRP uses a proactive mechanism of node discovery within a node's immediate neighborhood, while inter zone communication is carried out by using reactive approaches.[12]

### **4. Descriptions of MANET Attacks Analyzed In This Study**

There are different type of attacks may depends upon specific routing protocol or on specific requirement of attacker. In this section we are only presenting a brief explanation of the attacks used for testing of proposed work.

#### *4.1. Black hole Attack*

The this attack, the node exploits the mobile ad hoc routing protocol, such as AODV, to advertise itself as having a valid route to a destination node, even though the route is spurious, with the intention of intercepting packets. Then the attacker consumes the intercepted packets without any forwarding.

#### *4.2. Wormhole Attack*

In this attack the attacker records packets at one location in the network and tunnels them to another location and during the tunneling it can also read and temper the packets. Routing can be disrupted when routing control messages are tunneled. This tunnel between two colluding attackers is referred as a wormhole [8].The attack could prevent the discovery of any routes other than through the wormhole.

4.3. Selfish Attack

Nodes that do not forward other’s packets, thus maximizing their benefit at the expense of all others. They are assumed to always behave rationally, so they cheat only if it gives them an advantage.

4.4. Sleep Deprivation

Consists to make a node to remain in a state of activity and to make him consume all its energy. An attacker or a compromised node can attempt to consume battery life by requesting excessive route discovery, or by forwarding unnecessary packets to the victim node.

5. Probabilistic Neural Network (PNN)

In a PNN, the operations are organized into a multilayered feed forward network with four layers.

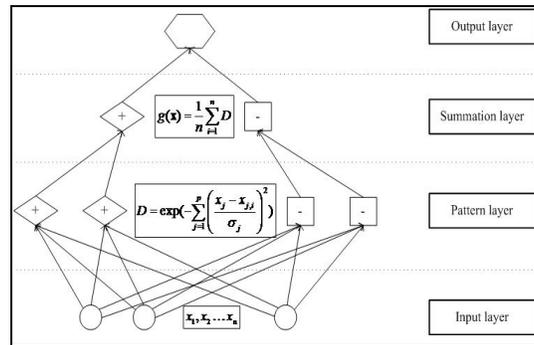


Figure 1: Structure of PNN [10]

The input nodes are the set of measurements. The second layer consists of the Gaussian functions formed using the given set of data points as centers. The third layer performs an average operation of the outputs from the second layer for each class. The fourth layer performs a vote, selecting the largest value. The associated class label is then determined [9].

6. Proposed Algorithm

In the proposed system we firstly simulate the different attacks on the MANET using network simulator and obtain the different parameters (table 1) during simulation. Now after collecting all the parameters a neural network is trained this is later used for classification of attack. The algorithm can be described in detail by following steps:

- Step 1: Design a MANET in network Simulator of selected configurations (table 2).
- Step 2: Configure different scenarios for different attacks (table 3).
- Step 3: Simulate all the scenarios and collect the parameters (table 1).
- Step 4: Formulate the table by sampling the collected data at specific intervals.
- Step 5: Normalize the each parameter by detecting its maximum and minimum values according to the following formula

$$V_{norm} = \frac{V - V_{min}}{V_{max} - V_{min}}$$

Where:

$V$  = Designate the actual value of parameter.

$V_{min}$  = Designate the minimum value of parameter from all scenarios.

$V_{max}$  = Designate the maximum value of parameter from all scenarios.

$V_{norm}$  = Designate the normalized value of parameter from all scenarios.

- Step 6: The normalized values set are arranged in an array to represent system condition by a vector this vector can be represented by

$$Trn_{vect} = [V_{norm1}, V_{norm2}, V_{norm3}, \dots, V_{normn}]$$

Hence the system states can be treated as n dimension vector.

- Step 7: Group all  $Trn_{vect}$  according to attack scenario they represents.
- Step 8: Now these vectors with their classification group are used to train the Probabilistic Neural Network (PNN).
- Step 9: Ones PNN got trained it can now be used as an attack detector.

- Step 10: Now for estimating the threat at any time we can sample the network characteristics at any time and apply (after normalizing) it to the trained PNN.

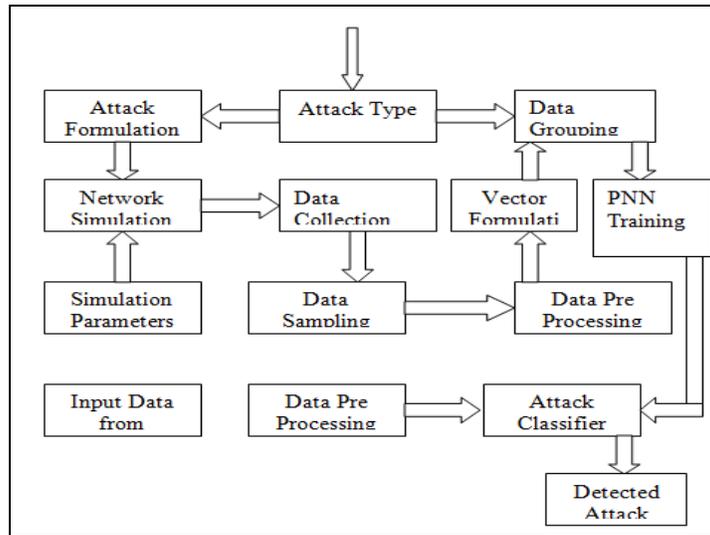


Figure 2: Block Diagram of the Proposed System

### 7. Simulation Results

The results from simulation of the different attack model in network simulator are shown in while the other details are shown in table 1, 2 and 3. The classification part of the proposed work is performed using MATLAB 7.5 Neural network toolbox in IBM P4 dual core 2.4 GHz processor with 2 GB of RAM and windows XP operating system. The results from this simulation are shows in tablet 4.1 and 4.2.

Average Number of Hops Per Route
Average Route Discovery Time (in Seconds)
Average Routing Traffic Received (Packet/Sec.)
Average Routing Traffic Sent (Packet/Sec.)
Average Packet Drop
Average Route Error Sent
Average Route Replies Sent
Average Route Request Sent

Table 1: List of Collected Parameters

Parameters Name	Value
Number of Nodes	20
Simulation Time	60 Second
Area	1km x 1km
Node Velocity	10 km/h
Packet Size	1024 Bits
Routing Protocol	AODV
Transmitted Power	5mW
Antenna Type	Omni-directional

Table 2: Network Configuration

<b>Attack</b>
Black hole
Wormhole

Table 3: List of Attacks Simulated

	<b>TPR</b>	<b>TNR</b>	<b>FPR</b>	<b>FNR</b>
Normal	1	0.7667	0.0333	0
Black hole	1	0.8	0	0
Wormhole	0.5	0.8	0	0.5

Table 4.1: Performance of Probabilistic Neural Network for Different Attacks

	<b>Accuracy</b>	<b>Precision</b>	<b>Recall</b>	<b>F-measure</b>
Normal	0.9667	0.8571	1	0.9231
Black hole	1	1	1	1
Wormhole	0.9	1	0.5	0.6667

Table 4.2: Performance of Probabilistic Neural Network for Different Attacks.

## 8. Conclusion

The model of the attack detector for MANET presented in this paper is not only capable of attack situation but can also classifying the individual attacks. The Detection accuracy of the system is up to 90% which is excellent also the algorithm have very low FPR (max 8.3%) hence reduces the chances of false alarming. The results also shows that it takes only 0.0075 seconds to identify the condition hence fast enough to prevent any damage due to delayed action. Further it could achieve much better performance by increasing the number of samples taken and increasing the number of characteristics parameter selected.

## 9. Acknowledgment

I would like to take the opportunity to thank people who guided and supported me during this process. Without their contributions, this research would not have been possible.

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## A Case Study on Entrepreneurship: An Art Explored

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### **Abstract:**

*Most people in our country strive for security in their careers, but there are few who make other's career secure and they are the entrepreneurs. By this case study we have tried to focus upon how an entrepreneur can generate employment and thus lead to socio economic growth.*

*On the road to success, entrepreneurs face numerous challenges but they come out victorious as every hindrance is a milestone for them. We have uncovered the huge entrepreneurial potential in India and tried to give every youngster a hope to think out of the box and create a difference.*

*Our primary objective is to focus upon the evolution that the Indian entrepreneurs have been through, the challenges faced by them, discovering the potential of Entrepreneurs in India and we have also tried to observe the role of incubators and Government.*

*We have gathered our data mainly from secondary sources comprising of online journals, websites, reports, newspapers. Our primary data pertains to an interview with Vishal Agrawal, Chairman of MPRTC.*

*At the end the researchers concluded that it is the innovative ideas of the entrepreneurs that fuel our economic growth and they ensure the poverty reduction and employment generation in our country thus emerging as a necessity in today's world.*

**Key words:** Challenges, Potential, Economic Growth, Poverty-Reduction

### **1. Introduction**

Entrepreneurial education and training = Growth, business creation and reduction of poverty

Entrepreneur is the artist who innovates, thinks and creates layman goods into a commercial phenomenon. The underlying spirit of entrepreneurship is innovation (Schumpeter, 1950).

An entrepreneur not just creates employment for himself but for the society as whole, efforts of one person lead to the development of the world. In developing countries entrepreneurship plays a vital role in the process of socio-economic development. Their journey is no less than a motion picture; they face a lot of challenges in the process, find companion, get help from various sources and finally reach their destination.

### **2. Methodology of the Study**

Information in the case study is based on primary and secondary resources. Our primary resource includes an interview with Vishal Agrawal, Chairman of MPRTC and secondary resource includes data from books, newspapers, websites and reports and journals.

### **3. Story of Entrepreneurship in India**

#### *3.1. Origin of Entrepreneurship in India*

Long years of colonization left severe scars on Indian Economy. 200 years of foreign suppression wiped out the independent mindset among the work force with little or no decision making ability whatsoever.

Entrepreneurship is a type of art and an entrepreneur is an artist. From time immemorial people have taken part in various entrepreneurial activities it may be hunting, agriculture, handicraft or industry. **Entrepreneur was defined by Schumpeter in 1964: “Entrepreneurs are innovators who use a process of shattering the status quo of the existing products and services, to set up new products, new services”<sup>1</sup>.** He is an artist who imagines and innovates ideas for his ‘target audience’. The ‘target Market’ is, in common terms, the set of customers to whom the entrepreneur pitches his products to. We think that development of this art of entrepreneurship also roots from ‘desire’ – a key objective in the Hindu Philosophy. Every entrepreneurial venture has a motive and a desire. It is this desire to change the status quo and to make the world a better place that he feels to experiment with this art.

3.2. Evolution of Entrepreneurship in India

India followed a centralized planning system after independence based on the soviet model of economy, the key character being the five year plans which was administered by the planning commission. The architect of this plan was Pandit Jawaharlal Nehru, India’s 1<sup>st</sup> Prime Minister, this era is also sometimes referred to as Nehruvian era.

The initial years of independence saw high growth rates and macro stability. The state undermined the role of individual enterprises and went ahead with building state owned enterprises dependent on centralized planning. Based on the successful experience of the former Soviet Union, Indian policy makers concluded that, particularly for a poor country, centralized planning was essential for the efficient allocation of an economy’s resources. It was inspired by the fund raising campaign that happened during the second Indo-Pak War in 1965-66. However, this entrepreneurship campaign failed to give expected results. The policy implementers did not realize that business development in a region is a long term process and there is a huge need for follow up on each venture. 1980’s sparked the new beginning for the small and medium entrepreneurs in India with the new government choosing to move towards a market oriented economy. The economic crisis of 1991 brought about the major change in Indian economic policy, the regulated economy shifted to an unregulated one – Liberalization, Globalization, Privatization (LPG). Soon by 2000, it was common to see young professionals preferring to become entrepreneurs and the least preferred career path was a stable government sector job. The capitalist India has since relieved millions from the burden of poverty.

4. Challenges Faced By Indian Entrepreneurs

The colonization left a deep scar on the already depleting Indian economy and after this India was plagued by the sociological mindset of Nehruvian era which discouraged capitalism. We will explain in detail few problems faced by Indians.

4.1. Cultural problem

We never sought new opportunity and always stick to the status quo by not innovating and experimenting with resources at hand. Job security and financial gains are expected out of the young graduates.

4.2...Maslow’s Theory of Human Motivation<sup>2</sup>

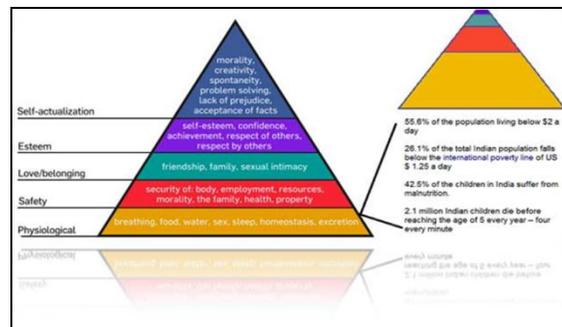


Figure 1

We present you the famous Maslow’s theory of human motivation. Abraham Maslow, an American psychologist came up with his theory in 1943. He stated that the urge to reform the world only begins when the lower part of the triangle i.e. the basic needs of a man like food, shelter, sleep are satisfied.

<sup>1</sup>Schumpeter, J. (1989) Essays on Entrepreneurs, Innovations, Business Cycles and the Evolution of Capitalism, edited by Richard V. Clemence, New Brunswick, N.J.: Transaction Publishers

<sup>2</sup>A theory of human motivation , Maslow , A. H .Psychological Review, Vol 50(4), Jul 1943, 370-396. doi: 10.1037/h0054346

Given the data from the triangle on the right side it is self-explanatory that majority of the Indian population lies in the yellow part of triangle. We have incorporated this analytical data in our case study only for analysis purposes. When we see the growing population of India and the urgent need to secure children and family to provide security for their future, we find that very few of them manage to go up the triangle and take risks, which an entrepreneur has to take.

#### *4.3. Bureaucratic Challenge*

Narayan Murthy, Founder of Infosys once said that 'An environment conducive to entrepreneurship is possible only if government becomes catalysts to business, and allow business full freedom'. Right from license of telephone connection to license of getting a piece of land –it was a rigid process to go through. Trading of goods also posed a major issue that made sure that Indians were behind their counterparts by at least two generations.

#### *4.4. Brain Drain*

Better pay packages, good economic climate, high quality of life has made lot of young graduates to search for jobs outside India. A report by Associated Chamber of Commerce and Industry of India (ASSOCHAM) pointed out that when a large number of students flocking to foreign universities, it costs India a whopping Rs. 95,000 cr. per year.

### **5. Discovery of Potential in India**

The very thought of Entrepreneurship reminds us of names like Tata, Ambani, and Premji. The immeasurable population of over 1.15 billion not only acts as a huge challenge for the country but also creates great amount of opportunities. We will have 400 million people below the age of 35 years within the next 20 years and India has been predicted to become the youngest nation.<sup>3</sup> Furthermore, India, being a democratic as well as a capitalistic country has competitive advantages over other countries. Success of Indian entrepreneurs in Silicon Valley is great to prove that we have the required knowhow and technology to take the challenge. World class educational institutions like IIMs and IITs have started with the concept of incubation and thus are helpful in contributing to the increasing potential in India for entrepreneurs.

#### *5.1. Can The Journey Of Entrepreneurship Begin In College?*

It will be wise to remind the words of Victor Hugo who once said 'no force can stop an idea whose time has come'. Young minds are bubbling with passion and energy which helps them bring new ideas on the table. Thus, All the youngsters should dream big to come out of the trend of following the path of already established norms and be the change of the country.

### **6. Role of Incubators for Startups**

Dr. Paul D. Reynolds, Director, Research Institute, Global Entrepreneurship Centre reports that Worldwide, there are about 300 million persons trying to start about 150 million businesses. Around 203 entrepreneurs are born every minute. So the question remains- Who will provide them necessary technical/non-technical tools to excel them in this competitive world?

This is where the role of incubators is essential. In our case study we have picked some of these incubators to explain how they help in different ways.

- I Pleaders - A legal-education start up has started a diploma course on entrepreneurship and business laws. It empathizes on teaching basic practical knowledge of law required by for day to day activities by a entrepreneur so that majority of legal issues can be managed by themselves. This course has been taken by people from various academic backgrounds.
- Startup Saturday- On the 2<sup>nd</sup> Saturday of every month, entrepreneurs across 8 cities come together around the campfire to discuss questions and ideas related to the Indian Startup world. On every Tuesday, latest happenings in the Startup world are broadcasted in – 'Starting Up on the ET Now channel'.

<sup>3</sup><http://www.thehindu.com/news/national/india-is-set-to-become-the-youngest-country-by-2020/article4624347.ece>

7. Sources of Finance

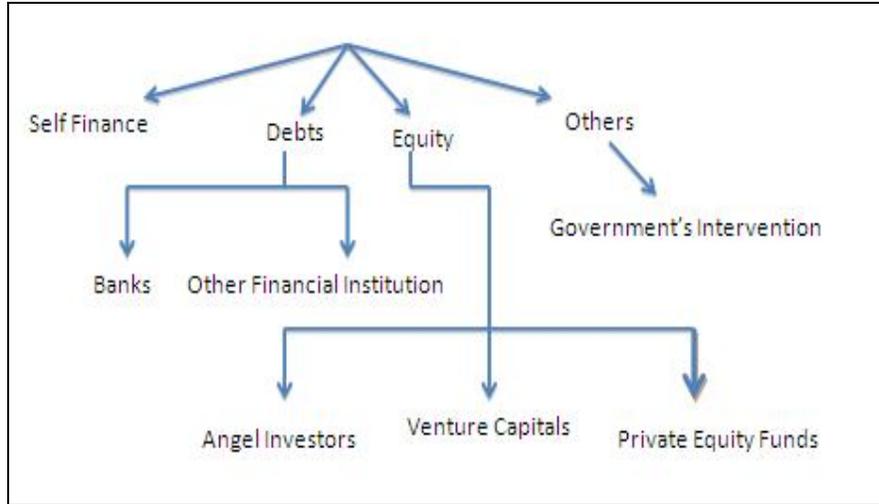


Figure 2

7.1. Self-Finance

Self-finance, as the name speaks it for itself is the investment of one’s own money or capital into the business. This is the most widely used source of finance. The investment includes one’s personal saving; borrowing from relatives etc. this is the number one form of financing used by most business start-ups.

ADVANTAGES	DISADVANTAGES
One’s own money is invested into the business so he is the sole owner of the business. Self-funding also allows the owner of the business to exercise control over the day-to-day activities of the business. Thus, it brings in autonomy.	Self-funding is a small source of finance. Capital invested from savings is, in most of the cases, very exhaustive. The owner is totally liable and hence there is amount of risk since, its his own money at risk.

Table 1

7.2. Venture Capital

In a Venture Capital, the investors give money to young business and startup firms that have long-term growth potential. This source of funding is very crucial for those young entrepreneurs who do not have access to capital markets. There is a high risk for the venture capitalists but they can earn above average returns and a substantial amount of equity in the firm. Majority of the venture capitalists are investment banks, wealthy individuals and other financial institution

ADVANTAGES	DISADVANTAGES
Venture capital funding minimizes the amount of risk. When a loan is taken from the banks there is a need to pay it back with interest added. No need of collateral. When taking loan, possessions such as home etc. is listed as collateral, which is not required in Venture capital. Expertise accompanies the VC funding. Most of these VCs consist of experienced and talented businessmen, which often bring in their advice, and invest their knowledge in the startup. This leads to the birth of innovative new ideas that maximizes their chances of success.	Loss of autonomy. Start-ups must give a substantial amount of share or equity to the VC, this means VCs acquire a say in the company’s decision making. This result in the loss of autonomy. There are certain restrictions on the part of the startup firm when a VC deal is signed. This includes employee salary and start up’s management team amongst others. This could be a lengthy and complex process. One needs to draw a complete business plan, and put forward company’s financial projection etc. Accounting fees and Legal expenses. At the deal negotiation stage one need to handle these external costs, which would add on to the financial pressure.

Table 2

### 7.3. Angel Investors

They are also known as Business Angels or Investment angels. They are investors who provide financial backing for small startups or entrepreneurs. Angel investors are usually found among an entrepreneur's family and friends. The capital they provide can be a one-time injection of seed money.

ADVANTAGES	DISADVANTAGES
IAs are free to make investment decisions quickly No need for collateral – i.e. personal assets Access to your investor's sector knowledge and contacts Better discipline due to outside scrutiny Access to BA mentoring or management skills No repayments or interest	Not suitable for investments below £10,000 or more than £250,000 Takes longer to find a suitable IA investor Giving up a share of your business Less structural support available from an IA than from an investing company.

Table 3

### 8. Government's Intervention

There are various schemes launched by the government to help young entrepreneurs to stand on their feet. One such legislation is the Micro Small and Medium Enterprise Act (MSME) 2006. Section 12 of the MSME Act also calls for the constitution of one or more funds for the sector, to which the government would provide grants.

Another brilliant examples is Mukhya Mantri Yuva Swarozgar Yojna (MYSY Scheme)<sup>4</sup> being implemented in the State of Madhya Pradesh which aims at promoting entrepreneurship in the state without the need for collateral security.

### 9. MYSY Scheme

The Objective of this scheme is to promote entrepreneurship in the Madhya Pradesh without the needs for collateral security. Following are some details about this scheme:

Nodal Office for implementation and monitoring of the scheme is the Department of Commerce, Industries and Employment.

Implementing Agencies: Panchayats and Rural Development Department for Rural Areas and Department of Commerce, Industries and Employment for Urban Areas.

Repayment: Not exceeding 84 months excluding the moratorium period.

Quantum of Finance: Rs. 25 lac

Margin: State Government will provide 20% of the project cost as Margin Money or Maximum Rs.10000 one shot basis for project cost up to Rs.50000

Rate of Interest: For Loan up to Rs.10 lac : BR+0.50%, For Loan above Rs.10 lac and up to Rs.25 lac: BR+1.00%

Security: No collateral security if the account is covered under CGTMSE. In other case security of 100% of amount of loan sanctioned to be taken.

### 10. Conclusion

Through this case study we analyzed the hindrances faced by the entrepreneurs in India and how they overcame the hurdles in their careers. We also discovered various sources of finance like venture capitalist, private equity fund and angel investors apart from the traditional ones like banks and other financial institutions, which plays a very integral role in the development of entrepreneur. Lastly, we also discovered the significance of government intervention in an entrepreneur's career. We thank our teacher and mentor Dr. Surya Rashmi Rawat for providing the guidance in this case study.

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<sup>4</sup>Mukhya Mantri Swaraj Yojna, An initiative by Madhya Pradesh Government for Young Entrepreneurs

**12. Questions**

- What are the alternate sources of finance for entrepreneurs other than traditional sources like loans from banks and other financial institutions?
- Which is the Incubator which provides practical legal education for Entrepreneurs?
- As an Entrepreneur, What are your comments on the economic and business climate in India?



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## Management of Resources in Library & Information Centres Special Reference to Electronic Era

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### **Abstract:**

*Rapid change in technology particularly the origin of information and communication Technology (ICT) and social political, economical changes require an appropriate managerial change in Libraries and Information Science Centers(LISC) and in the present paper the author has tried to highlight the types of resources available in the libraries and information centres. Modern library has both types of collection including traditional and digital. The role of librarian is to manage the resources by using modern management techniques to solve the problems and provide the sources and services effectively and efficiently. Also discussed about few famous web-portals of Library and information centres providing links to the end users in electronic era.*

### **1. Introduction**

Managing libraries and information centres has become a difficult task now a day in the 1940s libraries began using computers to manage circulation. Later card catalog became OPACs, which have now evolved into integrated library systems that facilitate all aspects of library work. Archivists adopted MARC in the 1980s to ensure descriptions of their collections could be included in institutional catalogs and national union catalogs more recently, archives is began using Encoded Archival Description (EAD), an XML-based standard for finding aids to augment catalog records and meet user needs. As technology has become more pervasive, so have the opportunities to continue improving how information professionals work. With the growing emphasis on e-resources, libraries are adopting modern management techniques.

### **2. Changes in Library Policies**

Changes in the objectives and functions of the library and information system by the planning body would directly impact the existing plans and policies of the library. Accordingly, change in plans and policies become essential. The development plans and policies should be in conformity with the objectives and functions of library and information system as well as the institution in serves.

Management change in Library and information Centre

Due to fast-paced technological change and new skill requirements, information professionals are increasingly required to renew their skills and practice in order to gain an awareness of technological advances. As a result, the profession itself exists in a state of flux alongside these emerging technologies, with traditional roles beings increasingly subsumed by new skills and working environments, and, therefore, job description (Ashcroft 2004)

Certain active roles are necessary for change management to:

- Establish the quality goals of the library and information Centers should aim to establish the quality goals for qualitative service to its user community.
- Provide the resources to their library: should provide all necessary resources suitable in the ICT era (e.g. e-books, e-journals and other e documents etc.) to manage the LISC in a better way.

### **3. The Structure Related Changes in Libraries and Information Centres**

Changes in the work design: The work design of a traditional library is not similar to modern automated library, so a change in the work design is compulsory for the success of automated library.

Change in the number of operation levels to perform various activities, routine work of library staff: As there is a major change in the processing and service departments a change in the number of staff in the lower level or operational level management has become essential.

Change in the plans, programmes, policies and procedures to and improving integration among various sections: Due to changes in the pattern of service; plans, programmes, policies and procedures and integration within various departments it is very essential to cater to the service in a better way.

#### **4. Management of Resources in E-Era**

##### *4.1. Digital Resources*

For developing a digital library, one has to start with following information resources:

- Already available internet resources-virtual Library
- Digitally born documents in the institution-physical Digital Library
- Resources available in print form- Digitization

##### *4.2. Virtual Reference Resources*

Internet is very good source of ready references. A number of online reference tools/sources e.g. Dictionaries, Encyclopedias, Thesauri, Glossaries, Biographies, Geographical sources including GIS, patents, standards, online databases, reference sources for current events e.g. conference proceedings and seminars, Directories', online interactive education websites on various topics etc. the list of such references sources can be compiled and make available to the researcher according to the demand of the users

##### *4.3. Digitally Born Documents in the Institution-Physically Digital Library*

The purpose of physical electronic library is to provide fast, uninterrupted access to the resources available through INTRANET. These collections may also be provided access through internet through web-portal.

The collection of the physical digital library may be

- Downloaded online full-length documents from the internet
- Journals available on CD-ROM
- In-house bibliographic/news clippings/question bank
- In-house databases
- Digitized documents
- Projects etc.

##### *4.4. Downloaded Online Full Length Documents Available On Internet*

The service provided to the user on demand or as per need on request. The full length articles, documents downloaded from the internet can be placed on the central server. Through the server, one can avail the facility.

##### *4.5. CD-ROM Collection through INTERNET or INTRANET*

The collection i.e databases available on CD-ROM can be accessed through INTERNET or INTRANET.

##### *4.6. Photo Gallery-Video Gallery*

The photographs or video of different events organized in the institution i.e. Annual function of the institution, conferences, seminars, visit of stalwarts, cultural activities, sports etc can be stored in directly as it is born digitally and dept for access on the central server.

#### **5. Digital Resources and Collection Development**

With the digitization of books, documents, journals and other forms of materials, modifications of policies would take place. Technology related factors have to be modified to include the hardware and software costs. As builders of collections, librarians now have a larger and more complex set of resources from which to select. These resources range from analogue versions of books, journals, encyclopedias and sound to digital versions of these in a variety of formats such as CDROM, DVD, digital video tape, to online digital e-journals, e-books and online databases. Digitization would also have an effect on the preservation and archiving as resources would also be available in digital format. Resource sharing and document supply would have to be re-thought keeping in mind the availability of digital resources.

#### **6. Human Resource in Electronic Era**

In the digital era, librarians, archivists, and records managers must be able to work with digital media as easily as they have worked with paper. They are able to manage electronics, including the ability to select, acquire, describe, organize, reference, and preserve these digital works. Managing electronic records must take at least three distinct factors into consideration. First, the rise of the internet, especially the web, and the diminishing costs of technology has made it possible to digitize collections of "born-analog" materials. Many records managers have had to learn how to work with digitized records. For archivists who work with unique materials, digitization projects have made it possible to make their collections accessible to a much larger audience and reduce the impact of physical handling.

Second, records professionals are now working with born-digital materials records and publications that may never be printed or cannot be represented in print. Given the rise of electronic information systems in business, records managers and archivists are confronted with enormous quantities of records distributed around organizations, often in decentralized systems.

Many of those records can be disposed or before long-term preservation becomes a problem, but archivists had found way to identify and preserve those born-digital materials that need to be kept permanently alive. Finally, technology has always offered all professions the opportunity to work more efficiently and effectively.

## 7. Management Of E-Resources And Services In Information Centres

The library and information Centre aims to develop a comprehensive collection of documents that is useful for the research scholars and disseminates information to the end users. Large database collection, union catalogues have been developed. Number of universities, institutions, Research and Documentation centres and Science and Science and Technology institutes have been contributed their collection in these information centres. Few library and information centres have been mentioned below.

### 7.1. Inflibnet

Information and Library network , Centre is an Autonomous inter University Centre (IUC) of University Grants Commission(UGC)involved in creating infrastructure for sharing of library and information resources and services among Academic and Research intuitions. INFLIBNET works collaboratively with Indian university libraries to shape the future of the academic libraries in the evolving information environment.

### 7.2. Nassdoc

The National Social Science Documentation Centre (NASSCOC) a constituent unit of the Indian council of social science Research(ICSSR) was established in 1969. The primary objective of the NASSDOC is providing library and information support services to social science researchers. It is considered to be one of the largest repositories of bibliographical databases in the area of social sciences. NASSDOC also provides guidance to libraries of ICSSR regional Centres and ICSSR supported Research institutes.

### 7.3. Niscair

National institute of Science Communication and information Resources (NISCAIR) came into existence on 30<sup>th</sup> 2002 with the merger of national institute of Science Communication (NISCOM) and Indian National Scientific Documentation Centre (INSDOC). Both NISCOM and INSDOC, the two premier institutes to the council of Scientific and industrial Research (CSIR), were devoted to dissemination and documentation of S&TI information. Broadly the core activity of NISCAIR will be to collect/store, publish and disseminate S&T information through a mix of traditional and modern means, which will benefit different segments of society.

## 8. Conclusion

Change management is only feasible solution to overcome all the difficulties and problems created in ever changing environment for the overall development and progress. The libraries of today are moving from traditional system to “Digital Library” and further to “Virtual Library” Accordingly libraries have to adapt to drastic changes to create their own identity to satisfy their users. The Library & information centres are providing both types of collection i.e. Traditional and born digital collection. They have developed the web-portal to provide the links to the end users. The traditional collection has been digitized in the form of repositories and born digital collection databases have also been developed. The automated libraries have step forward to digitize their rare collection and born digital collection to link for the end users, so that the users can access the information easily and user friendly.

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## Content Management System

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### **Abstract:**

*Some small business owners may want to use programs like Dreamweaver to try and build their own websites. However, they will require a solid knowledge of technical expertise in order for the result to meet the expectations of both their audience and search engines. Most times the results are disappointing and small business owners get very frustrated after having spent many hours trying to build their site. It is better to work with a professional to design and program your website and for you to focus on the content. The programmer will build a content management system into your site, which you will be able to access from any computer. This paper highlights meaning, functions, advantages and disadvantages of Content Management System (CMS)*

### **1. Introduction**

Content is a collective term used to denote all recorded material, whether physical or electronic, text or multimedia, which belongs to a business- the content usually, has a lifespan, which quantifies its relevance and utility. The policies and processes used to manage this content, taking into consideration its lifespan, are collectively known as content management.

The first Content Management system (CMS) was announced at the end of 1990s. This CMS was designed to simplify the complex task writing numerous versions of code and to make the website development process more flexible. CMS platforms allow users to centralize data editing, publishing and modification on a single back-end interface.

A content management system is made up of more than just technology. It includes the rules and processes by which content is created and managed in your organization. If you fail to capture these rules and processes adequately during the analysis phase, you will almost certainly be forced to address them later in the implementation. Unfortunately, the cost of changing course or coding workarounds grows more expensive and more time-consuming the longer you delay.

A CMS system may also provide tools for one-to-one marketing. One-to-one marketing is the ability of a Web site to tailor its content and advertising to a user's specific characteristics using information provided by the user or gathered by the site (for example, a particular user's page sequence pattern). For example, if you visit a search engine and search for "digital camera," the advertising banners will advertise businesses that sell digital cameras instead of businesses that sell garden products.

### **2. What Is Content Management?**

A Content Management System (CMS) is a computer program that allows publishing, editing and modifying content on a web site as well as maintenance from a central interface. Such systems of content management provide procedures to manage workflow in a collaborative environment. These procedures can be manual steps or an automated cascade.

Content management refers to the system and processes whereby information is created, managed, published, and archived. Information typically passes through this lifecycle for a finite period of time. A content management system (CMS) provides the necessary infrastructure for multiple persons to effectively contribute content and collaborate throughout these lifecycles.

A content management system (CMS) is a program that lets you edit your website's content without needing to know any programming language. To edit your content, your web developer will need to add a content management system.

CMS will not only prevent you from damaging the look and feel of the site but they will also save you a lot of time and headaches. For instance, a new webpage can be created in one click. They are purpose-built for non-techies. They might recommend re-programming the site using standards-compliant code and integrate the CMS at the same time.

Basically CMS (Content Management System) can be divided into two types:

- **Proprietary CMS:**  
Proprietary CMS is a content management system in which the back end code is available only to the particular developer, so only the single Admin can edit or customize the webpage.
- **Open source CMS:**  
Open source CMS is an open system that can be used by anyone to make any change by using any device.

Open source CMS, even though they can be downloaded at no cost, will require to be installed on your website by your programmer. You will generally pay a set fee for them to install it. In many instances, it is also possible to install a CMS on an existing website. Free open-source CMS are very popular because they allow programmer to adapt the code to suit your website requirements and benefit from the improvements other programmers have made to the system.

**The Options** Content Management Systems are built to help you effectively manage content for your institution's website and can be broken down into two primary categories: **open source** and **enterprise**. The major differences between the two are workflow management (the creation, editing and approval of content) and cost. Open source typically lacks strong workflow management and costs less, while enterprise typically does better with workflow management and costs more.

### 2.1. Open Source CMS

**Drupal** is a free CMS that allows developers to build anything from blogs to enterprise applications. As with most open source platforms, this one has a large and active community constantly working to improve it.

**ExpressionEngine** is commercial software built on an open source platform. It's supported by a committed group of developers and technical support specialists that are available to work with clients.

- Built on CodeIgniter, EllisLab's PHP framework
- ExpressionEngine's price tag is much cheaper than most of the enterprise options
- \$300 for commercial clients and free for non-profit, non-commercial and personal sites

**Word Press** requires little time to set up, and depending on the level of customization, a novice user could create simple content on Day One. There is also a "code view" option where more advanced users can edit HTML code in a page, post or article.

- Might be the easiest to grasp of the three open-source platforms
- Lowest level of customization for a content manager

### 2.2. Enterprise CMS

**dotCMS** might be a smart choice if you're looking to combine the innovation that comes with an open-source platform with the added support you typically receive with an enterprise CMS. It boasts solid customer support and a warranty covers all bugs and provides protection against any unwanted loss or damage to data. Enterprise clients also receive priority support.

- Different ways to interface with third-party applications
- Static content import, RSS import, XMS and direct SQL
- \$4,750 - \$9,500 perpetually with a 20 percent fee per year for maintenance

**Omni Update** has constructed a strong presence in the web applications marketplace since the early 1990's. It's widely used among community colleges, as well as public and private institutions. Omni Update claims that more than 550 college and university websites make use of its CMS. While those numbers are impressive, Omni Update's greatest strength is its customer support.

- 24/7 support offered for clients through phone and web
- A bevy of training and reference materials for users
- Enterprise server license for \$49,500 (one time fee)
- \$15,000 for implementation (one time fee)
- Support is billed annually at \$10,000

**Sitecore** is based on Microsoft's .NET-platform and offers three levels of content management from the back end that make Site core well-suited for editors of varying skill. Its easy-to-use interface is similar to Windows and offers excellent workflow management.

- Create as many content validation rules as you need to ensure proper formatting
- Based on the .NET-platform so it integrates easily with anything Microsoft
- Pricing can vary between \$20,000 and \$30,000.
- Serves roughly 2,500 customers who oversee 30,000 sites

## 3. Online Information Management

With the explosive growth of the Internet, fundamental content management needs have also grown. No longer can information be published online in a manual process and be left unattended. Online information must be continually reviewed and updated by content editors so that other content consumers, including customers and search engines, have access to the most up-to-date version. The Internet forced subject matter experts to more rapidly maintain and update information for their constituents. Prior to online communication, information was typically transferred via physical mail and faxes. With these forms of communication, lag times were often significant and distribution costs high. The Internet lowered communication costs tremendously, while providing instant access to a larger audience. Prior to the Internet, it was acceptable to publish new information on a quarterly basis, whereas now important

information is expected to be immediately available online. Web content management systems were developed to meet the needs of organizations with a growing online presence. A CMS typically offers:

- Easy content creation and editing for non-technical content contributors
- Access rights for security
- Structured workflow processes for content approvals
- Archival and versioning of content
- Templates for consistent output
- Content check-in/check-out services for distributed users

#### **4. A Content Management System May Have the Following Functions**

- Provide templates for publishing: Making publishing easier and more consistent with existing structure/design.
- Tag content with metadata: I.e. Allowing the input of data that classifies content (e.g. keywords) so that it can be searched for and retrieved.
- Make it easy to edit content
- Version control: Tracking changes to pages and, if necessary, allowing previous versions to be accessed
- Allow for collaborative work on content
- Integrated document management systems
- Workflow management: Allowing for parallel content development
- Provide extensions and plug-ins for increased functionality, Etc.

#### **5. Why Does Your Project Need A Content Management System?**

Content management systems are essential for large or even small-scale projects which involve the capture or creation of digital assets. They also are increasingly necessary for the creation of any but the most basic websites.

Managing the capture or creation of digital images requires metadata to be recorded which documents the capture, ownership, location and licensing conditions relating to each image. Even for a few dozen images, this may add up to hundreds of different pieces of information, the management of which would not be possible without some automated assistance. For a learning resource containing hundreds or even thousands of images, the job is larger still.

Similarly, managing a website with even a few pages is a time-consuming task when updates are required, perhaps when a page is added which requires the navigation menu to be updated on other pages, or when a logo changes which then needs to be reflected on all pages. For this reason, the use of templates which draw on content held in a database is a vital management tool. Without this type of application, the website would either fall out of date very quickly, or would require ever greater staff resources to retain its currency.

#### **6. Advantages of Content Management**

A CMS provides many advantages over traditional methods, particularly when distributed teams of users are responsible for coordinating and contributing to different content repositories

- Content management systems are almost always written well, and widely used. There are plenty of web masters that would swear to CMS abilities. Errors and coding bugs are rarely a problem, but only if you find a trusted and capable vendor.
- These systems can also be easily installed. It is not difficult to install these systems and get them running immediately. It is a simple solution for most that comes with a host of advantages.
- Content Management Systems are also easily available and offer a low cost solution to running and operating a website. This is in addition to the plenty of free CMS available on the market today.
- There is also a vibrant and active developer community where CMS is concerned. Most problems can easily be resolved in addition to free support when needed. Most of the support is available at any time of day or night, and mostly free. A quick solution can always be found with great ease.
- Almost any database can have CMS applied, as well as the software being easy to migrate to different servers.

#### **7. Disadvantages Of CMS**

As with any other kind of modern technology, there are known downsides to Content Management System that is worth exploring.

- A CMS can prove to be extremely heavy especially for small and simple websites, and may not be a first choice for most small website owners.
- The webmaster may also need to have expert coding capabilities to be able to configure or add to existing infrastructure. For most webmasters, this is mastery that they simply don't have, and an expert may need to be called in.
- To migrate a site, there needs to be available CMS on the technology where the site is being migrated to. Without this, the migration is cumbersome and difficult at best, and most times downright impossible.

Academic libraries, and their parent institutions, are also increasingly using Content Management Systems (CMSs) for website management. Institutional control over library website management, were raised. CMS satisfaction levels vary by tool, and that many libraries do not have input into the selection their CMS because the determination is made at an institutional level.

**8. Conclusion**

Knowing the advantages and disadvantages of Content Management Systems technology is the best way a new webmaster may be able to make their decision. It is also important to consider the specific website needs before taking any decision. It is often better to do extensive research and talk to an expert and other website owners before making any choices on which CMS to use for your website.

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## Usage of E-Resource in Academic Institution

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### **Abstract:**

*Libraries in the system of higher education as an essential integral component of the work. Academic libraries and library budget stable in storage due to the exponential price hike are facing a lot of problems. Currently the library environment with emphasis on e-resources in libraries leading to a new generation of fast and dynamic revolution. Many of the efforts of university libraries through consortia to share the financial crunch in the last few years this problem has been taken. UGC-Info net and INDEST-AICTE Consortium University Library users are two major initiatives.*

**Key words:** E-resources, Consortia, in the University Libraries

### **1. Presentation**

Represent an important component of electronic equipment storage building Activities of libraries. "Electronic Equipment" need to refer to the content Personal computer, mainframe, or whether via handheld computer access, Mobile device. They either locally or remotely via the Internet can access. Some the most frequently encountered types:

- E-Journals
- E-books
- Full text (integrated) Database
- Database indexing and abstracting
- Reference Database (biographies, dictionaries, directories, encyclopedias, etc.)
- Numeric and statistical database
- E Photos
- E-audio/visual resources

This guide is acquired through the purchase of electronic equipment only focuses on what is Birth of the web, or multiple format digital content (e.g., CD-ROM or from a free license) Combined with a book. There are a number of challenges exist in electronic equipment with traditional analog content selection and acquisition, and it is Develop clear policies and procedures for selection to the library and recommended such resources management. This will provide clarity for staff and will ensure that Electronic equipment within the library, the price is developed with due consideration Technical feasibility, licensing, usage and maintenance requirements, and constraints.

### **2. Purpose**

This guide aims to help develop an awareness of each of the key issues is to Library developed into an e-portfolio and will need to address. This guidance does not is intended to expand, but to provide reasonable and informed written the introduction of a wide range of issues presented by electronic means. Developing a subject area such as electronic equipment, addresses or guidance is needed updates. Thus, the appropriate periodic updates of this guide, as determined by, The Standing Committee of the IFLA Acquisition and Collection Development Section IFLA Net replace the previous version. Current document is simply a snapshot of Best practices at this point in time.

### 3. History

With this acquisition and collection development department, was established in 1996 Istanbul has changed name after the acquisition and Exchanges Department Conference in 1995. Standing Committee's mid-term meeting in Bologna, February 2005, the committee, acknowledged the need for the development of Native libraries in the e-resources, conceived as a book. More discussions Original idea had been raised since has grown to more than envisioned practically oriented Guide for Librarians and Administrators. This version of the Guide is the result of many meetings and presentations in recent years.

### 4. Space

This document is intended for use by libraries around the world related to Experience of dealing with electronic equipment and service orientation (e.g., educational, public). Focus on each key aspect of this document or, arranged in four large sections of the Complex libraries of electronic equipment in the sub-aspects: collection development, Selection and evaluation, licensing and review / renewal. An Appendix is provided the document appears to be within the definition of that word, as well as a list of resources. This document editing, delivery and access management, promotion does not cover Tools and user training and support. The purpose of the Standing Committee of the Covering different aspects of the electronic equipment and to produce guidelines Management within libraries. From the choice of materials for the library.

### 5. Digitization

Storage is also not considered within this document

#### 5.1. Advantages of E-Resources

In fact, the reasons for embarking on the purchase Electronic equipment is usually accepted because the utility, ease of reading, Affordability and accessibility. Below is a Print media on the benefits of e-resources.

- Multi-Access:- the network can provide product Multiple access points on a number of time points (24 hours a day. 7 days a week) and for multiple Simultaneous users.
- Speed: - electronic device is very fast Browse or search the information is to be excluded and other materials in the collection of data for Or search for a cross reference between the various Publications.
- Functionality: - E source will allow the user to Content analysis of the publications contact Search by clicking on the mouse, a new way.
- Mode:-Content: This email may contain resources of Amount of information, but more importantly, the Materials, mixed media, the images are Unable to change the video, audio and animation Some other benefits from the resources in print. Apart May include: international access, unlimited Capabilities, reduce costs, accommodation, search capabilities And connect.

#### 5.2. Electronic Equipment Selection and Evaluation

Traditional library materials, with the selector's decision to acquire an item of Only a limited set of policies in consultation with other departments and Guide. Electronic equipment does not interfere with the number one spot Traditional library materials. In addition to the standard analog material is applied, Access to licensed electronic publications, networking, around the complex issues raised Pricing, ownership, and rapidly changing technology and standards. With electronic Selector resources in the decision to acquire electronic equipment may not Isolation and must liaise closely with other departments in the library in order to evaluate the decision to acquire the suitability of resources. Usually this will involve Consultation with staff responsible for the technical systems and services, acquisitions, Source search (indexing and access), licensing and service agreements and delivery. To establish clear guidelines and good practice approaches to ensure consistency The selection procedures for electronic equipment. This can include Develop a check list for selection and evaluation; establishing clear roles and Responsibility and the establishment of counseling lines and electronic equipment A group can be composed of an electronic device, the evaluation panel Stakeholders from various departments within the organization. Collection development, including users of the library, which can be considered in Electronic tools to obtain feedback from users. The reaction may include possible new tools, as well as feedback on existing resources. Should the library. New content and services as well as potential temporary inform users about Problems with access to electronic resources? If appropriate to the library's collection of electronic equipment to be installed and the real and hidden costs help determine the effects of the acquisition, storage, Item related to the preservation, protection and other issues in detail Is required. This information needs to be reviewed against the library's electronic resources Collection development policy (see Section 1). Data type of the library will Sections 2.1-2.5 below is detailed to collect and consider useful. Some For example, a handful of libraries in the development of e-resource selection and evaluation can be found with a set of detailed checklist of questions to answer as part of selector Selection and evaluation process.

#### 5.3. Closure

Academic libraries are a cost-effective is a consortia-based subscription that are understood and also avoids unnecessary costs and duplicate subscriptions. The UGC - Info net of effort and INDEST-AICTE Consortium is sensible and certainly in India and free or subsidized access to scholarly resources in reality to fulfill their mission of educational institutions will help to strengthen the system of higher education. Consortia approach in the long term will be more popular among the user community, and it will be extended on the basis of information in the country consortia approach is not far behind.

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## **Modeling Security Concerns In Web Based ERP**

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### **Abstract:**

*ERP provides the unified business process across the organization by integrating various business processes. Presently ERP is experiencing the transformation that will make it much more intelligent, collaborative, web enabled, highly integrated and may become wireless. ERP systems are prone to high vulnerability and as the information is highly confidential, the ERP vendors have integrated their security solution but we need new technical approaches to secure ERP systems. ERP solutions worked upon common use of distributed application which causes security problems. This paper describes various security models for Web ERP systems using web service technology. This paper discusses ERP technology from its development through architecture to its product and security models in WebERP. The security solution in ERP and directions for secure ERP systems are mentioned in this paper. The approach here mentions an open security model for distributed ERP systems and needs further research.*

**Key words:** Web Service, Web Service Security (WSS), security modeling, Peer-to-Peer (P2P) architecture, XML

### **1. Introduction**

ERP systems are integrated, configurable and tailor made information system which manages all the information in an organization and incorporates business across the organization's boundaries. An enterprise can automate its business process, reduce cost of collaboration and complexity. ERP induces business process reengineering to optimize its business transaction and operations and finally delivers an efficient business scenario.

Today's ERP system such as SAP R/3 or Oracle consists of many specific modules which provide specific functionality. Further such ERP depends upon very large scale infrastructure such as servers and networking which are very expensive to initially and in maintenance. Today a lot of effort is being given to develop a ERP architecture which will facilitate further reusability business components through a shared, non monolithic architecture based on a peer to peer (P2P) network.

As common use of distributed application is being done, it leads to security issues. The objective of this paper is to describe an open security model for a shared ERP package on web technology (internet). In this paper we will discuss ERP technologies and framework including the communication platforms such as ALE, EDI, and also Exchange Infrastructure. Some security aspects of SAP and emerging web services for ERP. The overview of the ERP security using a layered approach and the RBAC model for ERP. Further we will compare these security aspects with authorization function of SAP R/3 system and the Baan security method. Recent researches in ERP security are also discussed.

### **2. Background & Motivation**

Today's ERP consists of various software component related to each other. Presently these components are administered using a single central application server. In regard to ERP system various complexities arise such as non requirement of all modules, investment in expensive networking infrastructure and expensive customization. All these problems lead to acquisition of ERP packages only by big enterprises.

A solution to above mentioned problem is to develop a distributed ERP package which will allow system components to reach over internet and this component combined will appear as single ERP network for the user but in actual it consists of different individual

elements existing on different computers. Based on this concept it is possible for a company to access functionality components over a P2P network.

This approach will solve the mentioned problems:

- Separation of local and remote functions will save wastage of local resources for unnecessary components.
- To make single components execution possible on small computers.
- Maintenance and installation costs will decrease due to decreasing complexity of local system

In common use of distributed application i.e. on web erp, several security problems exist and these are

- Resource protection
- Data confidentiality
- Data integrity
- Authentication of user
- Non repudiation of transaction
- Reliability of user
- Anonymity of user

### 3. Security Concerns in WebERP

Various WebERP security concerns need to be understood first before forming any model. Security issues that are specific to web-based enterprise resource in enterprises are as follows.

#### 3.1. Physical Security

The physical setting of software and data is an important part of a business plan as well as a software safekeeping plan. A physical security violation means that somebody with cruel intent has physical access to hardware where either our application is running or where our data is stored.

#### 3.2. Transmission Security

Data transmissions can be intercepted when data is communicated between the user, server, and database. A simple way to prevent requires encrypting all communication between source and destination. But encryption comes at a price to performance. If we spend too many processing cycles encrypting and decrypting the data, we will have to purchase more costly hardware or endure delay

#### 3.3. Storage Security

When ERP data is viewed by users, unauthorized access to users is limited due to requirement of business logic with the proper credentials. But a network administrator has direct access to data in the database. In such case, the data could be seen without going through business logic

#### 3.4. Access Security

Access security is significant for checking unwanted users from capturing resources and sending unofficial queries to our servers. Generally this is achieved through the use of firewalls that prevent discarded traffic from communicating with our business applications. Further lack of access security could impact one's application availability and thus provide hackers a chance to make it easier to steal passwords or resources.

#### 3.5. Data Security

Data security limits the access of data objects for specific individuals. Various levels of data security include insert, delete read-only and edit. One can be set the data security at the application or object level. Data security can be enforced either through business logic or at database layer. In most of the cases the business logic works towards authentication of users and provides them with certain rights to data objects. This means that only authenticated users can access to objects based on particular capabilities provided by the system. For e.g., a sales person may have read-only access to a product information so that he cannot change the commissions/pricing/margins associated with product. Also a sales person might have access to customer records that he is managing, but not having access to customers managed by other people. To simplify management decision making, systems offer role-based security so that administrators can allocate broad security policies to particular individuals. Accounting, HR, marketing, sales, shipping, management, etc roles can be recognized and assigned to individual employees. Employees that are performing more than one role can get multiple policies. Administrators can make changes to security for many people by assigning different roles at once without the need of changing individual records.

#### 3.6. Application Security

Application security includes two broad areas – firstly the way the application manages and secondly authenticates users and the way in which application code is controlled.

### 3.7. User Authentication

User authentication normally involves username and password to identify rightful users. User identity is critical for confirming data rights and also for creating an audit for follow up of activities for compliance requirements. Modern systems needs strong passwords, implement lock-out from excessive failures, and also give administrators the option to necessitate users to change their password at Specific time intervals. Beside these common security measures, administrators may also restrict access to the system by IP address to combat hackers that are trying to guess usernames and password from remote locations.

Authenticated users are granted access to particular data and processes. ERP application must provide security checks to prevent authenticated users from doing unauthorized work. For example, somebody only authorized to feed data should not be able to delete the data. If somebody is only authorized to fill out a form, then the data must be look at to prevent SQL and overflow injection issues.

### 3.8. Managing Code and Logic

All ERP software undergoes updates and revisions. The processes which manage these updates can be included as part of overall security plan provided by the vendor. For e.g., when compiling the final codes, processes are made to insure that rogue code is not put in into a production build.

As a WebERP uses shared hardware, shared operating system and a customer-specific application code, so the security issues are almost like to traditional ERP. Distances covered by transmission security are always longer, but it has little impact on overall security. When the WebERP is running a multi-tenant application process, the data security and application issues may be slightly dissimilar, but not necessarily less secure. Further in a multi-tenant deployment, the application must be designed so as to prevent client 1 looking client 2's data. Usually all WebERP applications are designed in this way. The multi-tenant application must assign resources so that client 1 cannot take resources from client 2 during a heavy usage period

## 4. ERP Architecture

ERP systems have evolved widely over the years. Initially, ERP systems were used for simple jobs such as accounting and HR planning. With the introduction of Web technologies, companies now such as Oracle, SAP, Baan, etc began developing a group of applications for ERP systems. The rising technologies such as Web service, extensible Markup Language (XML) have had a major impact on security of ERP systems.

In enterprises, some systems may be developed by the enterprises itself but others may be developed by various vendors using different databases technologies and languages. ERP system differs from each other and this makes it difficult to upgrade the organization's businesses, information technologies and strategy effectively. Since communication infrastructure and ERP functionalities are combined in components so an ERP system can easily meet these requirements. A typical Web ERP system should have the following features:

- Integration—various components are integrated and seamless data flow occurs between components to collaborate as a single function.
- Flexible—system is flexible, compatible and expandable with the old systems, changes to the business processes and strategies are easy to accomplish.
- Real-time—different components works in online, real time and batch processing modes should be presented.
- Componentization—different business functional requirement are designed as different components.
- Tailor able—system should be simply configured according to the enterprise's requirements.
- Profitability—ERP system must have the capability to reduce the cost or increase profit, since it is a basic requirements and motivations for any company.
- Security—security plan has to be imposed to protect various enterprise resources not considering whether it is suitable or sufficient. The business sense in ERP system utilizes client/ server architecture to create a distributed computing situation. Generally, the 3-tier architecture is used. This contains three layers of logic:
- Front layer of Presentation Layer: A combined Graphical User Interface (GUI) or any browser that collects data, generates requests, and proceeds the results back to the user.
- Middle layer of Application: Application programs that collects the requirements from the Presentation layer and further routes the request based on the business function, rules or logic.
- Database Layer (Back): Data Base Management Systems that manages the business and operational data throughout the entire enterprise. As the user has access to this information, this layer may also contains the operating system and the associated hardware, since these are necessary for the system but visible to users.

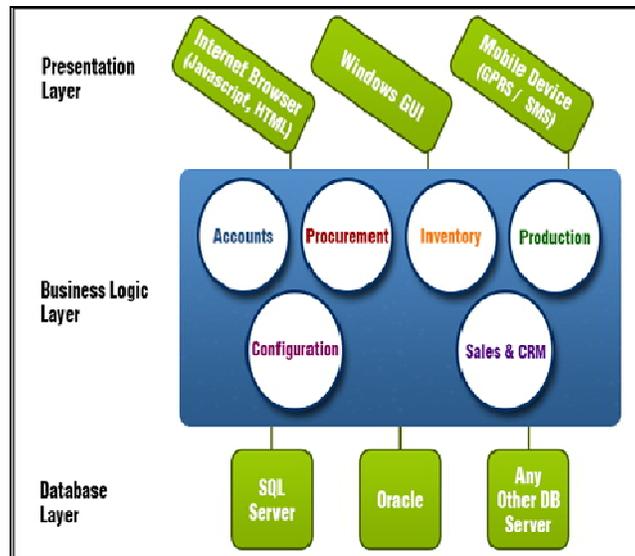


Figure 1: The Architecture Of Enterprise Resource Planning (Image Source: Emerladinsight.Com)

#### 4.1. ERP Technology

Important technical elements of the visualized design in WebERP are a P2P system as a fundamental network design schema and a Web Service technology as approach to frame a top level interconnection of business mechanism. In regard to security aspects a lot of research is being already done by the World Wide Web Consortium (W3C) and Organization for the Advancement of Structured Information Standards (OASIS). The following definitions give a brief knowledge of the theoretical and technical foundations.

- **P2P systems**  
Peer-to-peer' (P2P) refers to a category of systems and applications that use distributed resources to perform a critical function in a decentralized way
- **Web Services**  
Web Services are encapsulated software-components, self-descriptive which allows an interface for distantly calling their functionality and can be loosely attached by the exchange of messages. For achieving universal interoperability, regular internet technology is used for networking  
The use of Web services eases integration and reduces costs. Further clients want to access information without having to go through a ERP software. With the use of Web services and the composition of Web services, outsourcing vendors as well as clients can access many of the ERP applications seamlessly and easily.
- **Web Service Security (WSS)**  
WSS describes a set of existing extensible markup language (XML) standards and security mechanism and their grouping to a standard for securing messages being written in the Simple Object Access Protocol (SOAP) format. XML is a flexible text format standard developed by the World Wide Web Consortium (W3C) and is a simplification of Standard Generalized Markup Language (SGML) for large-scale electronic publishing .A major advantage of XML over other description languages such as HTML is its ability to represent data format using Document Type Declaration (DTD) schema or XML schema. This is the reason that XML is applied in many ERP applications developed in recently.

#### 5. Shared ERP Architecture

In above discussion we mentioned the division of the ERP system is based on a P2P architecture. In P2P architecture each peer can communicate with the rest of the contributing network nodes. Apart from other forms of P2P structuring, illustration below use a complete P2P architecture whereas the addition of a centralized control is discarded.

The responsibilities and duties of every network node are divided into two sections. First section has the service providing peers and second section has the ones which utilize theses services establishing the basis for exchanging software components, but the over-all functionality of system will be available to the whole ERP network. SOAP (Simple Object Access Protocol) messages which are mentioned in Web Service Description Language (WSDL) build up the communicational basis of this situation. Further in a Web Services registry ERP mechanism can be searched out by applying Universal Description, Discovery and Integration (UDDI) standards. New providers can be involved easier because of integration of these standards and new system functions are added by applying new Web Services whereby high flexibility is provided.

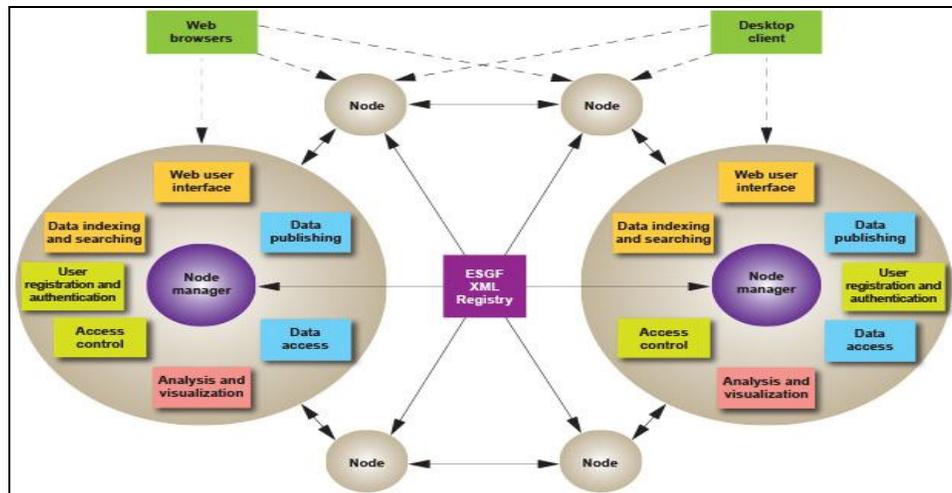


Figure 2: Various ERP Components in A P2P Network Are Based On Web Services Provided By ERP Peers (Image Source: Str.Lnl.Gov)

### 5.1. Peer Architecture in ERP

The contact between server and client is done by exchanging Web Service requests and responses as SOAP messages. Requests will include all the necessary input factors of the remote component boundary. Responses represent an occurrence of the pre-described return object. In figure below we can see message interchange.

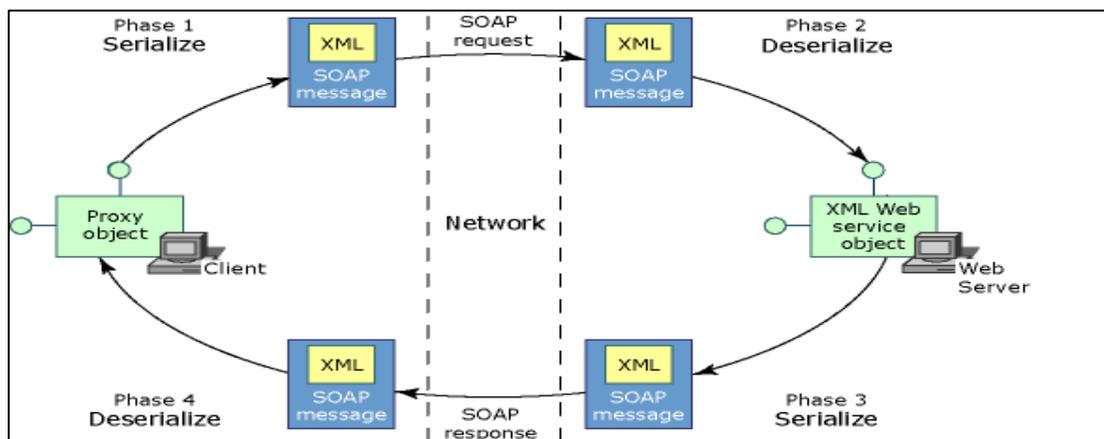


Figure 3: Communication between client and web service (image source: microsoft.com)

All incoming and outgoing messages must satisfy the hierarchic back end architecture of every individual peer. Corresponding with the motivation to incorporate standard methods, an ERP peer back end consists of the following elements:

- Webserver when Hypertext Transfer Protocol (HTTP) is using application layer basis
- Component repository which manages the local components
- UDDI registry for provision of offering public business component
- Central enterprise database management system (DBMS)

#### 5.1.1. Features Of Peer Architecture

- Components are employed as independent elements of different computers as ERP peers.
- Every participant uses a basic standardized installation
- Components of other participants can be accessed by other participants
- Ensemble of various network nodes together that will appear as a single ERP system to the user
- Different components can be developed by different vendors
- ERP system consists of system components which are distributed within a computer network.

### 5.1.2. Advantages Of Peer Architecture

- Standardized technologies such as XML will facilitates integration of new components such as SOAP, WSDL, UDDI
- Self organizing peer to peer network causes decentralization and thus reduces organizational expenditures

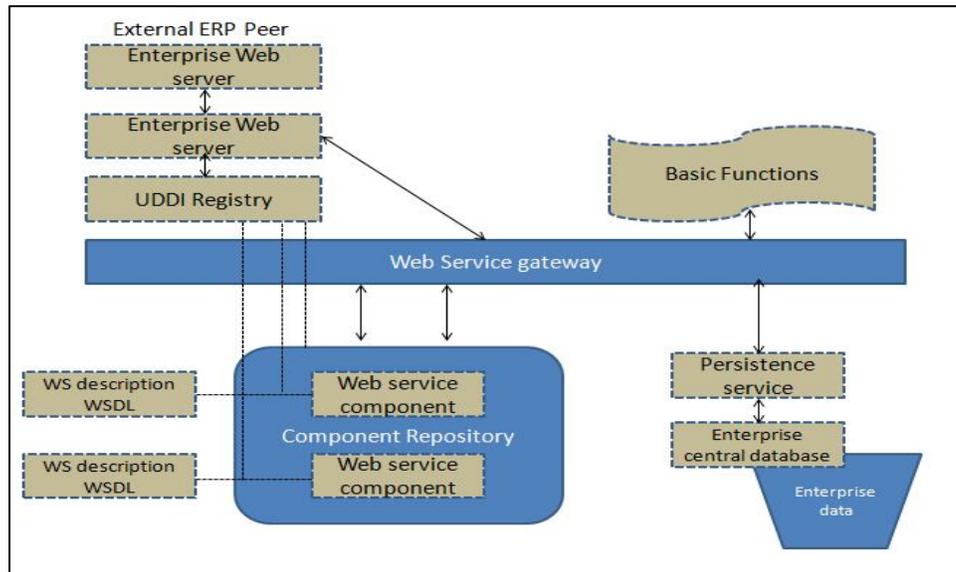


Figure 4: Schematic Diagram of Internal Peer Architecture- Controls Of the Whole Internal and External Access To Available Web Service Component by Web Service Gateway

## 6. Security in ERP

ERP systems are facing security problems, so security is important as ERP is used in numerous industries including defense, intelligence, financial and medical. Firstly, we need to develop a security policy and then a model for ERP systems. Many existing systems focus on confidentiality aspects of security. In this section, we will discuss the developments and current trends in security for ERP systems. We will discuss what needs to be secured, current developments, including security, for SAP. Further we will also discuss some of the next-generation security models. Also an overview of trends, security policies and Web services security are also discussed.

### 6.1. How to Approach Security in ERP

Security problem always exists in every component of an ERP system. These components can be classified into three categories- 1.network layer 2.presentation layer, and 3.application layer, which include internal interfaces, business processes and database. When a customer communicates with an ERP or various business components located in different places interact with each other, security problems in these cases are grouped into the network security domain. ERP experts will not deal with such cases directly and instead this function will be provided by purchasing from other vendors who are experts at fixing network security.

Application layer security needs large efforts of ERP experts to offer an effective way to secure the business processes and data. ERP technicians will also choose to activate or deactivate the security functions provided by the database vendor as per requirement of overall security solution

### 6.2. Current Security Solutions in ERP

- Role-Based Access Control  
Many of the current ERP systems are based on Role- Based Access Control (RBAC), although they may have different settings of either enhancements or simplifications. This model (Figure 2) defines roles and grants certain access rights. An RBAC model consists of the following components:
  - Roles: A role is a named job function within a organization and a role may be hierarchical. For Example-an engineer role is also an employee role.
  - Permissions: Permission is the access to one or more objects in the ERP system. Permission has different meanings in different environment. In a database system, if permission refers to the rights such as select, update, delete, or insert a record. Further if it is an accounting application then it may be the rights such as account creation/deletion, credit or debit, and transfer.

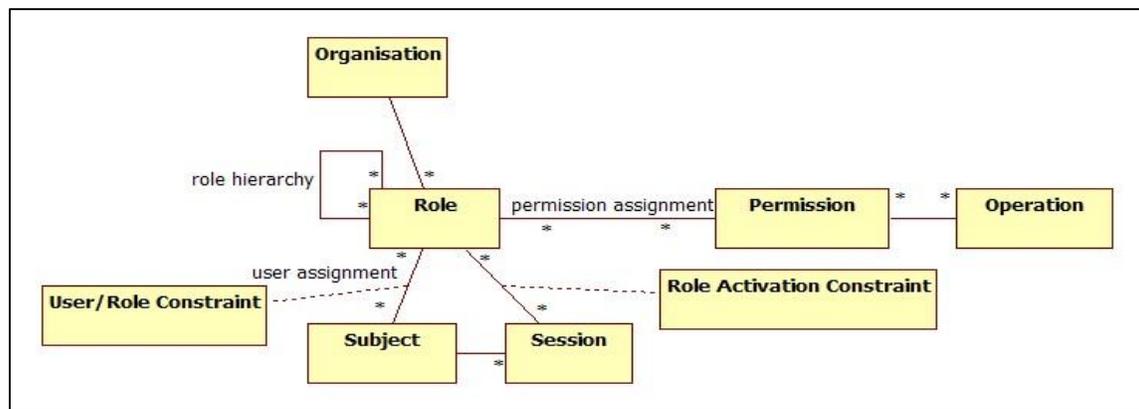


Figure5: Schematic Diagram Of Role Based Access Control (Image:Taggedwiki.Zubiaga.Org)

- Users: A user is a person who is assigned one or more roles.
- Constraints: In a system where there is only single administrator, then constraints may be meaningless. But if the administration is decentralized, means there are several administrators, then the constraints will be used by the senior administrator to restrict the junior's right to grant or deny the permissions.

### 7. Open Security Model

Constructing a new security layer and connecting it into the already existing architecture, requires considering different provision of individual security needs. Within the shown circumstance of a shared ERP system those necessities commonly correspond to message reliability, validity and data confidentiality of all interface calls and replies and thus of the entire network traffic. Since these strategic security objectives differ from each ERP peer to another one, it is crucial that the security model is open for virtually all security system and standards, which will allow the processing of basic definitions of security outline. Referring to the present security mechanisms a security outline describes the concrete security necessities of the appropriate network node together with the respective configuration parameters.

An appropriate profile processor is able to audit all the incoming messages for security fulfillments on the own security profile and also to extend all outgoing messages according to the security policy of remote ERP peer. Process sequence for this can be seen in figure below.

Same as in Web Service description (in WSDL), it is possible to create for related security profile and then to decide whether the remote guidelines are in accordance with the security needs of the possible caller and as result to communicate or not. For e.g., parts of those descriptions can be

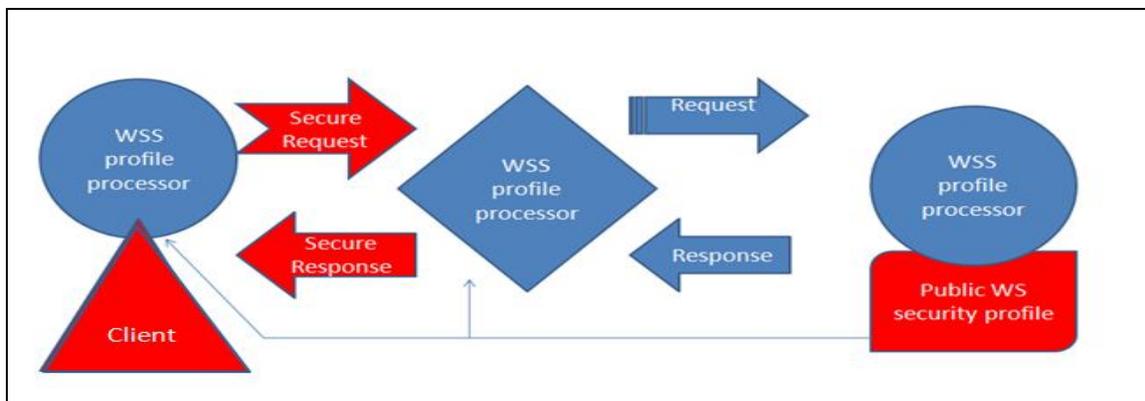


Figure 6: Schematic Diagram of WSS Profile Processing

1. XML encryption
2. XML signature
3. SAML-configuration parameter.

A Web Service Security (WSS) profile does not only contain security policy of a Web Service, but it also has a list of all supported security mechanisms. Such properties that are related to the remote system security could also describe the existence of a trusted environment according to a Trusted Computing Group (TC) which in turn would offer more important data privacy for non-public enterprise information.

The demands of the Web Service Security descriptions are satisfied and processed by a new security layer that we are calling security control gateway. It can be seen in the diagram below.

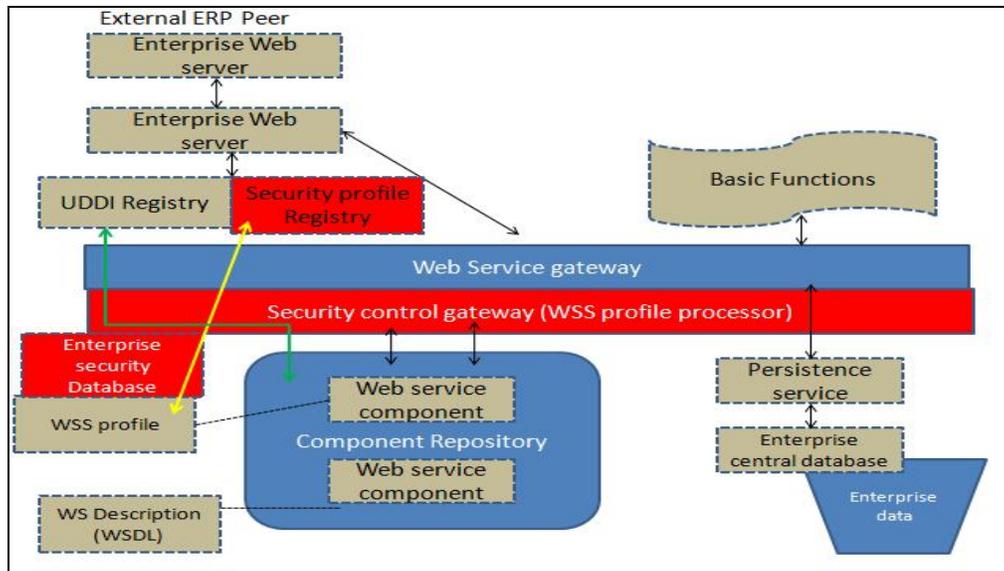


Figure 7: Schematic Diagram of Secure ERP Peer Architecture

### 8. Results & Discussion

Going deep into the history of ERP technology, it is easier to find out that the transformation from mainframe structure into client or server architecture is one of its biggest steps. This architecture makes it possible to develop a large system which will integrate a lot of functionalities. Further since ERP becomes the core of the operation and business in a company, ERP will not always remain the same in requirement as automation of business evolves. Future of ERP system may have the following features:

Feature	Description
Intelligent	ERP system in the future will have more components that perform the analysis, investigation and even advice on the strategic transformation. This feature says that more confidential information will move from within or out of an ERP system.
Knowledge-based	Enterprises are moving towards knowledge-based operation and so the ERP system that supports the daily business also needs to move towards knowledge-based management, operation and communication.
Heterogeneous	Heterogeneous means that the components from different vendors can coexist and cooperate in an ERP system. Normally it has two prerequisites-1.componentization and 2.integration. It is also true that some of the leading ERP vendors are going to make changes or have already done changes regarding these two aspects. Providing strong communication platforms to support heterogeneous applications and also the applications developed in the form of components is required.
Collaborative	This could be in the area of e-business. One can classify the business processes within an enterprise into two types- 1.enterprisecentric process and 2.collaborative process. Also processes such as accounting and payroll processing are enterprise-centric and others such as supply chain management are completely collaborative. Further in the future, more processes will be redesigned in a collaborative way. This implies that the ERP system will be more open and also more Internet-based.
Wireless	ERP system access from a mobile device.

Table 1: Future ERP Security Features

## 9. Conclusion

ERP is the technology which drives the reformation in the area of economy and impacts people's life style indirectly. Today ERP system is going towards a system with more coordination and collaboration and also higher heterogeneity and integrity, much more intelligent, highly operating on the level of knowledge, becoming wireless-enabled. Security issue within ERP has been there for a long time back, but today most of the solutions are based on the assumption that an ERP system is a closed environment system. Given the current trends, where ERP is more likely to become an open system, such solutions will be insufficient to provide the security. Even though many researchers are working in this area and some solutions are provided to better suites the open environment, but the security mechanism for ERP system has not yet been much brought to the open environment for further discussion. Besides, these existing security solutions like RBAC or SAP R/3 are based on the features of the current ERP system and since ERP reveals more and more new features that may be supported in the future, present security mechanism needs to be retrofitted and new security issues have to be identified.

In open security model proposed above we see that the division of transport data and content is the key-note area of the introduced security model. Furthermore, extended interface calls and responses sums up the respective information a network peer uses to serve or request ERP functional modules.

The prefixed article builds an open architecture which will not only considers the integration of existing security standards such as XML encryption or XML signature or SAML but will also aids future developments like Trusted Platforms. So before such a secure shared ERP system can be switched on we need further research into Web Service security (WSS) profile schemas must be done.

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## Leadership Qualities: Librarianship in Digital Era

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### **Abstract:**

*This paper finds out the ways of traditional leadership in the LIS field. It also attempts to cover the new challenges that are cropping up in the recent years. In due course it tried to find out the qualities of leadership that helps to suit the need of digital librarianship. It attempts to present a framework to achieve goal and mission i.e. the ultimate user centered LIS universe under the dynamic leadership of the digital librarian.*

**Key words:** Librarianship, Digital Era, Leadership skills, Digital Libraries

### **1. Introduction**

Leadership is an important issue in all sectors wherever there is a team working together to achieve a common goal. The Library is also an organization where a team of professional, semi-professional and non-professional employees strive to serve a common purpose, namely, to cater to their clientele in the best possible way. So, the leadership issue continues to hold an important position in the management thoughts related to librarianship.

With the passing of decades and centuries many things changed shape in the arena of the Librarianship. The shift from micro to macro information, the changes in format of resources, the entrance of upcoming technologies to cause a radical shift in dimensions of information storage and retrieval; and many other factors have contributed to the growth of Digital Librarianship. There seems to be a need of thinking proactively about the ways to combat this challenge.

### **2. Traditional Libraries**

In the initial days, books were few and far between; copied by scribes, almost always backed by the royal patronage. Users were the royalty and the topmost rung of the social Manpower Management and Development layers; whereas a few very scholarly people, favored by the affluent class might have allowed sniffing perfumes of the knowledge fragrance. With printing, there came a fresh bridge of hope in the knowledge field with books printed in multiplied numbers and more and more people came into contact of books. Gradually the Public Library Movement in different countries brought in the concept of “People's University” and the commoners were included in the privileges of enjoyment of knowledge embodied in books.

### **3. Traditional Librarianship**

With the flourishing of the libraries as a centre of knowledge, it became evident that a librarian and his team were needed for preserving the books and later the periodicals. The establishment had become vast and the basic service of preserving books along with occasional readership had multiplied into acquisition processing, storage, dissemination, preservation conservation. Gradually all of those blossomed into intricate branches with many library scientists offer theoretical and practical treatises on different aspects of librarianship. All of that literature was of the same opinion on one count: all were preaching custodianship.

### **4. New Age Libraries**

The new age librarianship brought out several changes the most important being the shift from possession cum custodianship to access. There were several dramatic changes in the dominion of LIS. The formats were diversified from print to digital via other non-print mediums. Some such changes are

- From possession to access
- From custodianship to facilitator
- From guardian to friend (of users)
- From reader to user
- From time-bound access to any-time-access
- From space-bound access to anywhere-access
- From librarian (or library-centred) to user-centred
- From rigidity to flexibility
- From ascetic environment to informal environment
- From specified/strict norms to the Information Commons
- From strict disciplined library to relaxed pursuit of knowledge
- From direction (from library staff) to participation (in the decisions)

### **5. Copybook Leadership to Heuristics**

Leadership is a quality to lead the team of workers. This is one of the most important qualities in the managerial capabilities. As is always said the strength of a chain is at the point of its weakest link, the librarian as a team-leader has always the role of motivator in such a way that all his team members become capable to work (at least) adequately as per the requirements of the job in hand. In the traditional era, all the roles of staff employed at Challenges in Library Management System (CLMS2012) different sections were well defined. The main consideration was monitoring the routine work and to supervise the exigencies. In the digital era- as we have seen above- many changes occurred to change this status quo. In fact, it is a time of constant change. During this transition period of being a dynamic leader, the librarian needs to consider several aspects:

- Leading from the front
- Practice before preaching
- Better among equals
- Friendly- not bossy- attitude
- The depth of subject knowledge in the area of the job-at hand
- Awareness of the personal as well as social limitations of the staff (as well as himself)
- Assigning a right person to right work
- Understanding the special aptitudes of staff
- Keeping in mind likings and disliking of staff while allocating jobs
- Remembering the invisible presence of the users
- While designing services and passing this attitude to co-staff
- Instituting proper orientation training for the new recruits
- Organizing regular refresher courses for the staff
- Regular ICT workshops for staff
- Giving extra privileges to staff as a reward and recognition of good work
- Arranging invited lectures by eminent Library & Information professionals
- Allocating suitable infrastructure for every service points
- Providing ergonomic as well as aesthetic furniture for the staff

### **6. Custodian to Facilitator**

Librarianship has passed through a long journey and we have to weed out some of our older concepts while adopting quite a few new ones to suit our changing needs. The role of library leaders is now to nurture a breed of techno savvy, skilled manpower, equipped to serve a new brand of techno-savvy users. Users of digital era know a lot of things beforehand. So the library team has to go a step forward and to be aware of the quality resources available in the digital (as well as print) scenario.

### **7. Challenges of Digital Era**

Due to its radically diverse nature of the traditional era, digital era provides miscellaneous benefits but it also offers various challenges. So the leadership in today's environment needs many skills and capabilities in today's multi-user, multitasking online learning environment. They should have adequate technical knowledge of Operating System Software, Word Processing Software, Power Point Presentation Software, Spreadsheet, Graphics, Database Management Systems, Webpage Development and Content Management. Software, CD ROM Database Searching, Networking Concepts, Digital Library Management Software, etc. Free and Open Source Software are to be used as much as possible. They should have a thorough understanding of knowledge resources (both in traditional and digital form), very adoptive towards change, pro-active, strategy-planner, flexible.

### 8. Towards Knowledge Economy

Physical as well as virtual space has now been utilized for library and information activities. In this changed and challenged environment, copybook leadership is no help. So, a library leader in the digital era has to be innovative, enthusiastic, and pro-active. With clarity of vision and the judicious use of the web 2.0 tools as well as empirical knowledge, his mission is to create a user-centred library. The journey towards 'Knowledge Economy' will only be fulfilled if all stakeholders in the knowledge chain (from inception to dissemination to feedback to further creation of new/modified knowledge) take active and interactive participation in the whole process.

### 9. Conclusion

Whatever changes and challenges happened over the time, Creth (1996) has said that the "values that are the foundation of the library profession should remain the same into the next century ... values of service, quality, universal access, and co-operation".

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## Digital Library: Components and Management

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### **Abstract:**

*This paper discussed different mechanisms of the digital library, collection infrastructure, the digitization process involving selection, conservation and preservation, digital resource organization, digital library services and the scenario of digital libraries in India. It further discussed the IPR issues and digital right management*

**Key words:** Digital Library, Component of Digital Library, Born Digital IPR Digital Right Management

### **1. Introduction**

Today's libraries are hybrid in nature i.e. a combination of traditional and modern libraries. The term modern libraries encompass three concepts viz. (Difference between Electronic, Digital and Virtual Libraries, 2011) Electronic, Digital and Virtual Libraries. An electronic library is a library consisting of electronic materials and services. Electronic materials can include all digital materials, as well as a variety of analog formats that require electricity to use. A digital library is a library consisting of digital materials and services. Digital materials are items that are stored, processed and transferred via digital (binary) devices and networks. Digital services are services (such as reference assistance) that are delivered digitally over computer networks. These are the libraries "with walls as well as without walls"; it depends upon the way the users access it. Both digital and electronic libraries can be virtual libraries if they exist only virtually - that is, the library does not exist "in real life." These are libraries "without walls" and also known as web based libraries.

"An informal definition of a digital library is a managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network." (Arms W., 2005)

### **2. Components of a Digital Library**

Components required for a digital library can broadly be categorized into the following components (Arora, 2008)

- Collection Infrastructure
- Digital Resource Organization
- Access Infrastructure
- Computer and Network Infrastructure
- IPR and Digital Rights Management
- Digital Library Services

### **3. Collection Infrastructure**

The collection infrastructure typically consists of two components, i.e. metadata and digital objects. The metadata provides bibliographic or index information for the digital objects. While digital objects are the primary documents that users are interested to access, it is metadata that facilitates their identification and location using a variety of search techniques.

The digital library collection can be developed in three ways

- Born Digital resources
- Buying Access to External Digital Collections
- Converting of Existing Print Media into Digital Format (Digitization)

### *3.1. Born Digital Resources*

Ricky Erway has defined types of born digital resources viz. Digital photographs, digital documents, harvested web contents, digital manuscripts, electronic records, static datasets, dynamic data, digital art, digital media publications (CDs, DVDs, etc.). The libraries may frame policies to acquire, preserve and enrich the digital library collection by born digital resources. (Erway 2010)

### *3.2. Buying Access to External Digital Collections*

The digital libraries can develop the collection by purchasing access to external digital collections like scholarly e-journals and bibliographic/full text database (J-STOR, Emerald, J-Gate, EBSCO, etc.) This also includes subscription to consortia viz INDEST-AICTE Consortium, CSIR E-Journals Consortium, UGC Info net Consortium, N-LIST, DAE Consortium, MCIT Consortium, 11M Libraries Consortium, FORSA Consortium, etc.

### *3.3. Converting of Existing Print Media into Digital Format (Digitization)*

The collection of a digital library can be built up by conversion which converts analogue formats to digital formats.

## **4. Digitization Process**

The digitization process involves three main steps i.e., Selection, Conversion and Preservation.

### *4.1. Selection*

The process of selection of material for digitization involves identification, selection and prioritization of documents that are to be digitized. The documents should be selected for conversion based on the criteria viz. Content, demand, condition and type of document.

### *4.2. Conversion*

It involves following steps

### *4.3. Data Capture*

The data can be captured by manual data entry, Imaging with scanners or digital camera and doing OCR (Optical Character Recognition). Electronic scanners are used for scanning of an electronic image into a computer through its original that may be a photograph, text, manuscript, etc.

### *4.4. Data Processing*

Quality control is an important component in every stage of a digital imaging project. The captured data have to be processed in order to image enhancement, amplification, compression and to remove the noise in OCR processing. For this purpose special software can be used.

### *4.5. Storage*

The most tenacious problem of a document image relates to its file size and, therefore, to its storage. The scanned images, therefore, need to be transferred from the hard disc of scanning workstation to an external large capacity storage device such as an optical disc, CD ROM / DVD ROM disc, NAS, etc.

### *4.6. Organizing and Indexing*

It includes developing a metadata schema, assigning metadata and/or unique object identifier to each digital object, linking digital objects with associated metadata to facilitate browsing and searching, organizing digital objects and associated metadata into a database and building browse, search and navigational facilities.

### *4.7. Retrieval and Display*

Typically, digital library software use database management system at the backend, sophisticated search engines and user-friendly search interfaces as front-end to facilitate search and browsing of resources available in a digital library. Users are also allowed to refine their search strategy. Once the required images have been identified their associated document image can quickly be retrieved from the image storage device for display or printed output.

### *4.8. Preservation*

The process of maintaining materials produced in digital formats in a condition suitable for use is a real challenge. Problems of physical preservation are compounded by the obsolescence of computer equipment, software and storage media. Migration, Replication, Emulation, Refreshing, Metadata Attachment, Trustworthy digital Objects, Normalization, Bit stream Copying, Technology Preservation, Digital Archeology, Analog Backups, Encapsulation etc. are the digital preservation strategies used in digital libraries.

## 5. Digital Resource Organization

Classification schemes, Subject headings List, Thesaurus, Catalogues are the tools for resource organization in traditional libraries whereas addressing protocols, development of Metadata Schemes, assigning metadata to digital objects, assigning digital object identifier (DOI) to the digital objects, linking of objects with associated metadata for searching and browsing capabilities, organizing the digital objects with metadata in the database and building browsing and searching interfaces.

## 6. Access Infrastructure

This includes Search and Browsing Interface which facilitate Simple Search and Advanced Search with Boolean queries, wild cards, phrase searches and field- specific searches.

## 7. Networks and Computing Infrastructure

It includes hardware and software requirements. Servers, Nodes, Printers, Scanners, Digital Camera, Sound Recorders, etc. is the hardware requirement whereas System Software, Application Software, OCR Software, File Format converter, Web server, Database software, Antivirus, Networking software, Image enhancing, Compressing software are software requirements. Digital Library Software viz. Dspace, E- Print, Greenstone, Fedora, Academic Research in the Netherlands Online (ARNO), CERN Document Server Software (CDSware), I-TOR, MyCoRe, Archimede etc. are open source software.

## 8. Intellectual Property Rights (IPR) and Digital Rights Management

The developers of digital libraries are obliged to take permission for inclusion of copyrighted material in digital form or develop mechanisms for managing copyright, mechanisms that allow them to provide information without violating copyright. Digital Rights Management (DRM) refers to the technologies and processes that are applied to describe the digital content and to identify the user. Further it refers to the application and enforcement of the usage rules in a secure manner. The primary purpose of DRM is to control access, use and distribution; and thereby protect the interests of copyright holders in the online environment. The legal context for DRM is copyright law. The United States of America (USA) copyright and the European Union (EU) Countries have their DRM system derived from the World Intellectual Property Organization (WIPO) Copyright Treaty of 1996 (WCT). Most of the European countries have private copying provisions in their copyright laws, which allow consumers to create copies of the legitimately obtained content for their own use or that of family members (Rosenblatt 2007). In the online environment, the scope of DRM can be leveraged to control access to and usage of digital objects and to impose restrictions on their misuse. This can be achieved through

- Log-in ID and Password-based Access
- IP Based access
- Product Activation
- Fractional or Partial Access
- Control of the Interface
- Hardware Locks (Dongles)
- Digital Watermarking
- Cryptology

## 9. Digital Library Services

The major digital library services include

- OPAC to web PAC
- Digital Reference Service
- Library Chat Rooms
- Electronic Delivery Services
- Virtual Library Tours
- Ask-A-Librarian
- Real Time Services
- Bulletin Boards
- Web-based User Education Web Forms
- Frequently Asked Questions (FAQ)
- Selective Dissemination of Information in Digital Library: Delivering Customized Contents
- RSS Feeds

## 10. Digital Libraries: Indian Scenario

### 10.1. Library Consortium in India

- INDEST-AICTE Consortium (Govt.-funded)
- CSIR E-Journals Consortium (Govt.-funded)
- UGC Info net Consortium (Govt.-funded).

- N-LJST
- DAE Consortium (Govt.-funded)
- MCIT Consortium (Govt.-funded)
- IIM Libraries Consortium
- FORSA Consortium
- Scholarly Science Journals
- Theses & Dissertations
- Vidyanidhi
- Shodhganga

## 11. Conclusion

Digital libraries are beneficial to all researchers, scholarly institutions and the entire research community. Building world standard digital libraries, as powerhouses of knowledge, that are able to address the complex issues put forth by the technology push as well as the demand pull are fast catching up worldwide attention. During the past five years India has been responding to this global trend quite proactively and positively and a number of institutions have started the initiatives in this direction. However building and maintaining digital libraries is a great challenge before library professionals.

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## Determining the Optimal Revenue Management Approach Using LPP With Reference To Hotel Industry

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### **Abstract:**

*This paper brings out, the hospitality industry and its importance in present days, from “Atithi Devo Bhavo”, means guest is god to five star hotel base services. It discusses revenue management, a technique of decision making to optimize the profit from perishable inventory. Today, high technology, skilled manpower and a sophisticated yield management are crucial to survive in competitive edge. The purpose of the present study is to establish the relationships between salient revenue management principles with intention, to develop a model that would mathematically associate these salient characteristics into other primary factors and connect to other area for further research. Development of this model would be a valuable asset for the design, development and analysis of revenue management. The study may assure, to protect some extent of revenue are possible by using this and it is user friendly.*

*"If America with its little over 300 million populations can have five million rooms, surely India with its billion plus people should at least match that number". –Sam Pitroda.*

**Key words:** Optimization; LPP; Revenue management

### **1. Introduction**

Hospitality is an integral part of existing creation. For human society, it is a chance to offer hospitality. Guests are like as god in the form of human being. It is not an activity of present society, but so earlier of existing civilized social life. In the early days of social life, pilgrims, travelers, peddlers and explorers needs a break, halt and sojourn to sanctify and put a flavor to their hectic life pattern. In that day's people opened their homes, temples, schools, meeting place for decent activity and reciting the god name to these traveler as treating as virtual god. In the flow of time, demand for break, entertain and accommodation born as an industry for hospitality.

India is known, as the land of hospitality and today. This industry comprises a variety of service industries like food service, tourism, entertainment, hotels, transportations, health and other auxiliary sector like handicraft and handloom. Hospitality industry suffers from fluctuations of economy, crunch of infrastructure, political instability, cross culture perceptions, regionalism and religion intolerance etc every year.

The hospitality industry is second only to the global oil industry in terms of turnover, and the largest employer of the world. Tourism is the most important civilized industry in the world. Its contribution is of 6.23% to the national GDP and 8.7% of the total employment in India. Tourism continues to play an important role as a foreign exchange earner for the country. In 2010, foreign exchange earnings (FEE) from tourism were US\$ 14.19 billion as compared to US\$ 11.39 billion in 2009, registering a growth of 24.6% [12].

### **2. Research Question**

There are many questions raise in the mind of scholars, experts and entrepreneurs. These are few of them.

In spite of, availability of different models, techniques and system, why the highly vulnerable industries are unable to adopt it?

Are the model/techniques, suitable for small or middle type companies?

### **3. Objectives of The Study**

Keeping the view to above problems the possible objectives of study are follows.

- To study the existing practice of RM.

- To know what does Hospitality and RM mean to me.
- To develop a LPP model for the well being of industry.

#### 4. Methodology

For management research, it is important for scholar to assess the methods and models, the study employ. This study based on secondary data and theoretical information collected from the various journals, books, magazines, websites etc.

#### 5. Reviewing the Literature

There is lot of literature available about revenue management by different scholars and experts, still few of are through different models with mathematical form by using inferential statistics, fuzzy logic, DEA, stochastic process, differential equation and OR etc. Basically, the study has followed two types of literature as from practitioner and other one academician point of view to find commonality behind that comprises the revenue management process.

The hospitality (and tourism) industries is one of the world's largest sector, accounting to more than 10% of Gross Domestic Product (GDP) and employing huge number of people. Tourism itself only employs 8% of the global workforce [2]. The standard industrial Classification (SIC) defined it "establishments (whether or not licensed for the sale of intoxicating liquors) providing meals, light refreshments, drink or accommodation". It describes as combination of three core services of food, drink and accommodation... a blend of 'tangible and intangible elements and services, atmosphere and image that surrounds them'.

This industry can be divided into two parts, accommodation and entertainment like clubs, bars and pubs. Accommodation can be in the form of public houses, resorts, inn, hotels, hostels, serviced apartments, and motels. The clubs and bars category include restaurants, fast foods, and nightclubs.

##### 5.1. Revenue Management

Once, two passengers of same flight or two boarders of same hotel talked each other; how they are paid different price for same service in same time, in the same airline or same hotel and with same category, May they booked at different time? They surprised and asked each other how will it be? Hence how can the same airlines or hotels, manage profit by charging so different ignoring similarity? The true answer for this amusing question is "effective revenue management. Then, what is revenue management? It is a process for capacity constrained industries to maximize profitability by allocating the right inventory to the customers at the right price. It is also known as yield management. This concept is relevant to product or services, which are highly perishable, allow for advance and temporary sale, discriminating among segments and have inconsistent demand patterns with low margin. By applying this concept revenue can gains 2-8% more [11]. So this process can significantly increase revenues through better inventory management and pricing. Through these concepts, firms can protect premium inventory for sale at higher prices, and stimulate the growth through discounts and minimize loss of perishable inventory.

It is a technique to optimize the revenue earned from a fixed, perishable resource. The challenge is to sell the right resources to the right customer at the right time. Revenue Management implements the basic principles of supply and demand economics in a tactical way to generate incremental revenues. It is high relevance in cases where the constant costs are relatively high compared to the variable costs. The less variable cost there are, the more the additional revenue earned will contribute to the overall profit [1]. So revenue management tries to maximize the profit by optimal allocations of hotel rooms among the different categories of customers like premium class, business, economy and vacations.

Yield management is an integrated, continuous and systematic approach to maximizing room revenue through the manipulation of room rates in response to forecasted patterns of demand [3].

According to the study by Upchurch et al, the leading objective of RM is to maximize the revenue considering the time and demand fluctuations [7]. The primary factors which are influencing the revenue process are overbooking policies and patterns, forecasting the demand properly, cancellation system, length of stay, tracking to no-show customers and compensations, walk-in system, supply and demand patterns, type (daily, monthly weekly) of statistics, pricing practices, market segmentations, competitors and strategies adopted etc.

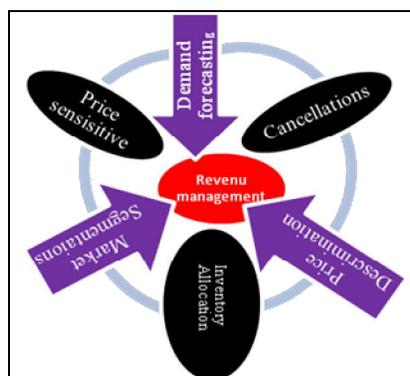


Figure 1: Concept of RM

## 6. Model Building

As the study have already been mentioned about different types model in earlier literature, the present building of model is related to linear programming problem(LPP),which is the simplest form optimization techniques of operations research(OR).There are three types OR methods, first is statistical, second as stochastic process methods and third one is Mathematical programming (MP) methods. In the MP methods there are Methods of calculus, Calculus of variation, Linear programming, Geometric Programming, Dynamic programming, Nonlinear programming, and CPM & PERT. Here the study will be limited to linear programming which is a deterministic form having more degree of certainty than stochastic.

The process of getting the best values for the decision variables both for unconstrained and constrained problems, that means minimum or maximum values under given constraints are called optimization. The optimum seeking methods belong to the discipline of mathematical programming (MP) which is a branch of operations research (OR). "OR is a branch of mathematics applied to decision-making problems and obtains the best solutions"[10]. A linear program (LP) is defined as

Minimize (or Maximize)  $Z = c^T x$ ,  $x$  subject to  $Ax = b$ ;  $x > 0$ , where  $A = (a_{ij})$  is an  $m \times n$  constraint matrix,  $c = (c_i)$  is an  $n \times 1$  column vector,  $b = (b_i)$  is an  $m \times 1$  column vector,  $t$  indicates transpose,  $0$  represents the  $n \times 1$  null column vector and  $x$  is an  $m \times n$  real matrix. There are two types of forms of simplex problem, one is standard form and other is canonical form. The earlier problem is standard form and when instead of  $=$  it will be either  $\geq$  or  $\leq$  in constraints; it is called as canonical form of LPP. LPP can be solved into two methods. One is graphical method, when the LPP having two decision variables. And when the LPP having more than two decision variables it can solved with simplex method. Simple method is two types, like big-M method and two-phase method. The simplex algorithms due to Dantiz in 1963 is an exterior-point method and existed for more than two decades till the exterior point method come before the decision maker. An exterior-point method is one in which the  $n$ -dimensional solution point  $x$  will always lie on the boundary or at corner of the convex region (or Polytope) defined by  $Ax = b$ ,  $x \geq 0$  and not inside the convex region. The clear conceptual knowledge about the simplex develops interior-point method. This method is one in which the solution point  $x$  will move inside the convex region or at the best touch the boundary and continue to remain within it or a corner point of the same region [4]. Some theorems are there which can support the preceding statements.

Theorem-1: The set of convex combinations of a finite number of points of  $S \subset R^n$  is a convex set.

Proof. Let  $S = \{x : x = \sum_{i=1}^m \lambda_i x_i \geq 0, \sum_{i=1}^m \lambda_i = 1, x_i \in S\}$ , then

We have to show that  $S$  is a convex set.

Since proof is out of purview in this study, the reader can refer to "Swarup, Gupta and Mohan, Operation Research, 14/e, [9] & [10], for further reference".

To construct a linear programming problem, we have to take certain assumptions. The study has taken here some important assumptions which are primary factors to the problem. These are: (I) demand is determined for next day with the help of previous data, (II) There are 5-types of price band, (III) all requests for a fare class arrive earlier than the requests for premium or business class [5], (IV) Model is to be determined for the individual customers (or if group will be avail in any day, it will be treated as individual basis) and (V) the lower class book first [6], (VI) The following model is only for demand vs. availability, (VII) accepting requests for rooms are independent of the number of rooms already booked. The study has taken five categories of hotel rooms for customers; these are premium class (p), business (b), standard (s), economy (e) and super economy (se) class [8]. For this, the LPP can be follows:

$$\text{Maximize, } Z = kP_p X_{t,p,k} + kP_b X_{t,b,k} + kP_s X_{t,s,k} + kP_e X_{t,e,k} + kP_{se} X_{t,se,k}$$

Subject to constraints,

$$X_{t-1,p,k-1} + X_{t-1,b,k-1} + X_{t-1,s,k-1} + X_{t-1,e,k-1} + X_{t-1,se,k-1} \leq b_{t-1}$$

Non-negative restriction,

$$X_{t-1,t,k-1} \geq 0, \forall t, k = 2, 3, 4, \dots \text{ \& } X'_{t-1,t,k-1} \text{ s are integer and } t = p, b, s, e \text{ and } se.$$

The above equation can solved and can be found out the profit maximization as well as availability of different categories of rooms. In order to the above result, the hotel manager can be prepared, occupancy and revenue strategy for second day only.

Then for the second day the LPP can be follows:

$$Z = kP_p X_{t-1,p,k-1} + kP_b X_{t-1,b,k-1} + kP_s X_{t-1,s,k-1} + kP_e X_{t-1,e,k-1} +$$

$$kP_{se} X_{t-1,se,k-1}$$

Subject to constraints,

$$X_{t-2,p,k-2} + X_{t-2,b,k-2} + X_{t-2,s,k-2} + X_{t-2,e,k-2} + X_{t-2,se,k-2} \leq b_{t-2}$$

Non-negative restriction,

$$X_{t-2} \geq 0, \forall t = 3, 4, 5, \dots \text{ \& } X'_t \text{ s are integer}$$

For the third day the LPP can be as follows:

$$\text{Maximize, } Z = kP_p X_{i-2pk} + kP_b X_{i-2bk} + kP_s X_{i-2sk} + kP_e X_{i-2ek} + kP_{se} X_{i-2sek}$$

Subject to constraints,

$$X_{i-3,p,k-3} + X_{i-3,b,k-3} + X_{i-3,s,k-3} + X_{i-3,e,k-3} + X_{i-3,se,k-3} \leq b_{i-3}$$

Non-negative restriction,

$$X_{i-3} \geq 0, \forall i = 4,5,6 \dots \& X's \text{ are integer} \dots\dots\dots$$

Hence, above LP problems (for 3-days) can extend for n-number of days as per, it consolidate to the above assumptions. The model can help for better assignment of rooms. The study is considering the four factors only, though it not happens in real life situations. So the problem can be incorporated to more number of factors to make it more useful. As the above problems are with four variables may be solved with simplex method manually, and with more number of variables problem can be solved, after changing the LPP to Dual problem. Because, dual of dual problem is LPP and result be same (Theorem-[9] & [10]). Further, it can be solved by using software package MATLAB and Latex etc.

## 7. Conclusion

Overall, the desired outcome of a sophisticated yield management system is to carefully maintain for highest possible revenue (maximize room revenue) from fixed room capacity by adjusting pricing through different patterns of demand. In future RM will be customizing, cost & value base and technology focus. Though RM is a multidimensional nature, influence of some key factors are relatively more than others. According to World Travel and Tourism Council, India will be a tourism hot-spot from 2009–2018, for highest 10-year growth potential. So it is the time, to shift the sector to prior and primary one not only Govt. but the public should be aware.

### 7.1. Research Limitation & Future Implications

Above problems are not suit for multi period reservation policy. It does not account the important factors like overbooking, cancellation, no-shows and earlier & late booking policy, though these are pivotal to maximize revenue and will be increased the margin. This is a deterministic model on the basis of assumptions, having certainty for variables used, which may not reflect to real life. So for this the study can be extended to stochastic process. The call for future is to test the model and confirm its reliability with outcomes. This current study can be extended with coming days by incorporating the earlier limitations. The study was only for hotel industry though the revenue concept was coined for airline industry. The important study would, to minimize assumption as possible as. It can be applied to any other vulnerable industry.

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## Fostering Organization Culture & Innovation through Strategic Human Resource Management

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### **Abstract:**

*Continuous changes in the economic scenario and intense competition in the public and private sectors have compelled the organizations to undergo radical changes in its approach towards business. Innovation is one of the vital processes through which organizations achieve competitive advantages in the dynamic knowledge driven economy. Effective management of human capital is a key component for organization wide innovation. This paper focuses on the essential human resource policies and practices through which organizations can create and preserve a culture which fosters innovation. Strategic HRM initiatives are targeted at nurturing the desirable skills and behaviors in employees which are in tune with an innovative organization.*

**Key words:** SHRM, innovations, organization culture, competition, strategies

### **1. Introduction**

Innovation has nothing to do with how many R&D dollars you have.....It's not about money. It's about the people you have, how you're led, and how much you get it.  
- Steve Jobs, Fortune, November 9<sup>th</sup>, 1998.

Many organizations put great emphasis on and effort into formulating strategies to achieve competitive advantage. Yet strategy itself is less important than the organizational capability to execute, which further depends heavily on organizational culture. Culture is critical to any organizational success and perhaps is the most important area through which Human Resource can help an organization improve innovation.

Organizations can innovate by introducing new products and services or technologies. Adoption of a new way of operating the business can be termed as innovation. Formulation and execution of new business models and strategies and formulation of a new organizational structure to facilitate changed work processes are part of the innovative process. An innovative organization constantly focuses on finding the problems and weaknesses in the products produced or the service delivered by it through the observation of process and feedback from customers. A close follow-up of the current trends in the market, strategic moves of the competitors and changing pattern of consumer demand are the essential requirements for an organization to be innovative.

The next stage is the generation of ideas about a new product or service which can fix the existing problems or provide an edge to the organization over its competitors. The most important stage is the execution of these ideas which would actually result in an improved performance for the organization. The key difference between creativity and innovation is execution: the capacity to turn an idea into a successful service, product or venture.

The importance of innovation in the present global context need not be overemphasized. According to a survey conducted by conference board, in 2004, among the CEOs of global companies, innovation was ranked as the fourth highest priority from a list of 62 challenges. As innovation is also an enabler of customer loyalty, the third highest priority in the survey, it gains more importance.

The opinions expressed in the survey indicate that innovation is not only a desirable but essential component for achieving other objectives of the organization. In the survey, CEO expressed the opinion that innovation can lead to enhanced competitiveness in developing countries.

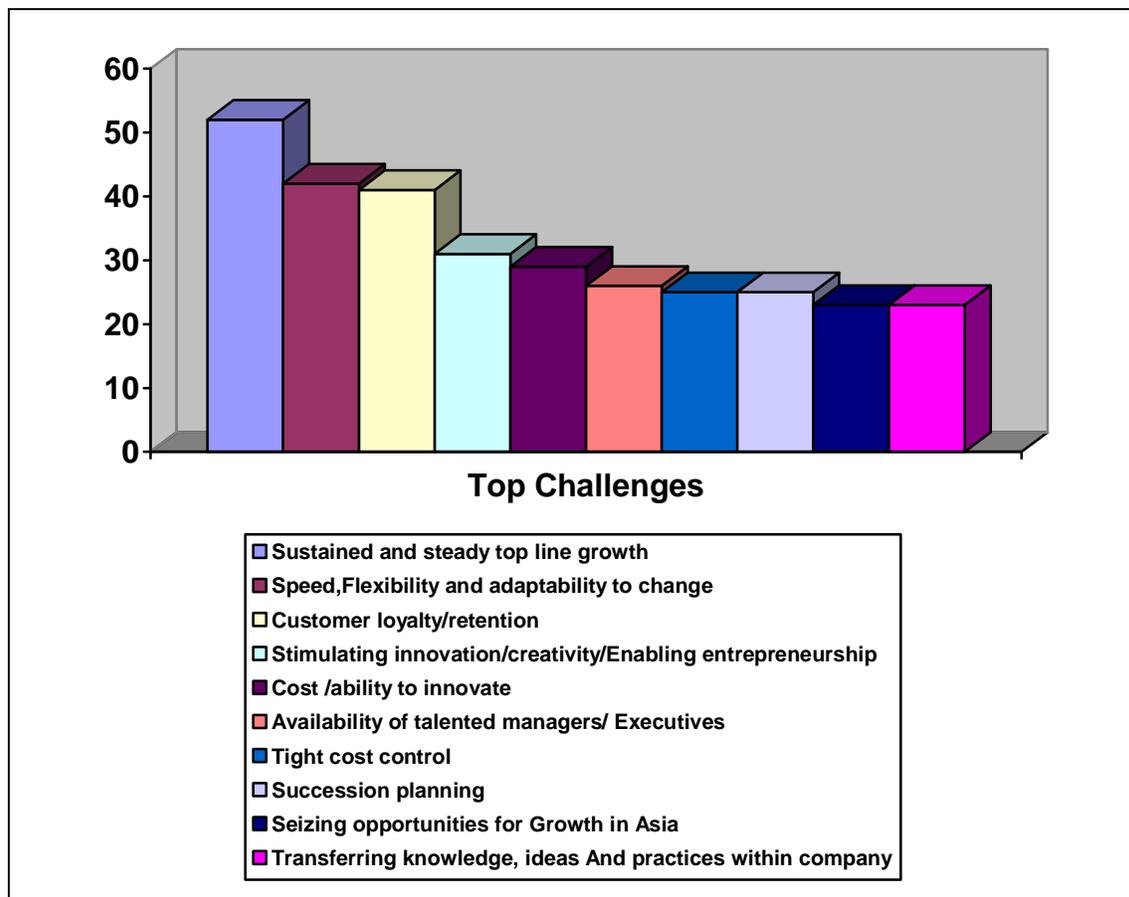


Figure 1: Top Ten Challenges Worldwide

(Source: CEO Challenge 2004: Perspectives and Analysis, the Conference Board)

## 2. Review of Literature

The review of literature reveals that organizations today are open to many changes and innovation. Chung Ming Lau (2004) An HR system which emphasizes extensive training, performance-based reward, and team development is necessary to create an organizational culture that is conducive to innovation.

David Grey (2009) in HBR mentions, strategies for workforce can be changed, modified or adopted as per choices available in organizational structure.

Organizations are in the process of changing over to new practices for better performance, linking performance with rewards and motivating high performance (Clarks Hoffman, 2002)

## 3. The Strategic Role of Human Resource Management

The primary responsibility of strategic HRM function is to help in generating innovative ideas in the organization. Ideas can evolve inside the organization or it can be borrowed from outside. Anyone can be the source of ideas for an organization: Suppliers, partners, customers and even competitors. In order to create a systematic process of idea generation within the organization, HRM can be a crucial player. Through the formation of cross functional, cross hierarchical groups and teams focused on innovation, organizations can reap benefits. Conglomerate businesses can form cross-unit teams to facilitate the generation of ideas or transfer of knowledge.

For creating a culture of innovation, it is not sufficient only to facilitate the idea-generation process but the HRM function has to continuously support the idea generation process with linked measures. This linkage or alignment is to be achieved right from the process of human resource planning. The HR department has to identify the Key Performance Areas (KPA) needed for the crucial designations.

During recruitment, the candidates' skills, abilities, and experiences have to be matched with the organization's innovation requirements.

The selection process has to be designed accordingly so that only those candidates who have the essential and desirable qualities are ultimately entered into the organization. While selecting someone at the senior position, the organization has to be extra careful in selecting someone with proven track record in innovation.

It is very important that the new employees and executives at all levels are properly communicated about the innovation culture within the organization during the initial days and the induction process.

**Mind Tree Consulting**, a fast growing software development company in India, spends a substantial amount of time in communicating the organization's principles of "Imagination, Action and Joy".

For best utilization of the acquired talent in the company, the people have to be placed in appropriate job designations and groups. If an innovative employee is not facilitated by essential support from peers and resources, he can hardly contribute to the innovation process of the organization. Aligning the performance management and reward process of the organization in sync with performance of the innovative employees is another prerequisite.

Moreover Innovation has to be recognized and rewarded through monetary as well as non monetary benefits.

Let us look at how the HR function, through its activities, can create an innovation-oriented organization.

- **Recruitment and Selection**

Experts have generally proposed application of a less formalized and implicit selection criteria for innovative organizations. The argument for a more open system of recruitment and selection is that it would allow employees to select themselves into innovative organizations. This will result in a desirable fit between the individual and the organizational goals. Psychological tests have been prescribed for identifying the right candidates but there is no general consensus on a best practice of recruitment and selection.

- **Socialization**

Not surprisingly, experts and researchers in strategic HRM not only reach a consensus, but also emphasize on the importance of socialization in an innovative organization. Socialization involves acclimatizing an individual to the culture, norms and values of the organizations.

- **Training**

Training activities in innovative organizations should be spontaneous, informal, and unsystematic and should encourage participation, according to RS Schuler, who is one of the eminent scholars in the strategic HRM field. Supporting his view, experts have said that the training process should be continuous, less structured, and should stress on individualized knowledge requirements. This form of training would enable employees to adjust to the changing conditions in a more appropriate manner. In innovative organizations, intense training should be provided where employees develop a broad range of skills. There is a different school of thought although, which is in favor of a very little amount of training.

- **Career Development**

In an innovative organization, broad career paths which develop employees based on implicit rather than specific criteria are more adaptable. This is more suitable for changing circumstances and all round development of employees. Traditional methods of career development planning are unlikely to facilitate innovation in organizations. A progressive career development program attracts highly skilled employees to innovate employees, as it provides greater scope for advancement in a variety of different positions. At the same time, an effectively designed "promoting from within" policy motivates employees for better performance.

- **Performance Appraisal**

HRM department should be focused on formulating a performance appraisal scheme which communicates a tolerance for failure and which provides employment security. An approach to performance appraisal with a long term perspective and result oriented approach influences employee motivation in innovating the organizations. Research suggests that appraisals which assess group rather than individual achievements are most likely to achieve positive results.

- **Compensating Systems**

Designing the right compensation structure for an innovative organization is arguably the most contentious issue among scholars as well as practitioners. There are contrasting views which lay emphasis on individual incentives and group based incentives. There is also a debate whether results or behavior should be the main parameter for rewarding employees. While some authors on strategic management argue that innovating organizations should adopt compensation systems which stress on external or market based equity, others argue that internal equity should be emphasized. However, the consensus is that the designing of the compensation package should be flexible and it should include employee stock options.

As there are conflicting opinions about the best suited HRM approach in innovative organizations, the key decision makers have to be very cautious about making a choice among different options. A crucial aspect here is the "horizontal fit" or "internal congruence" among the different HRM functions, which effectively points out, there might be a possibility of having "deadly combinations"-bundles of HR practices which neutralize rather than reinforce one another. Notwithstanding the difference in opinions among the strategic HRM specialists, empirical results from different surveys have established a set of HRM practices which are most suitable for an innovative organization. Significantly, these bundle or set of individual HRM practices are similar to the ones known for high performance organizations. These are as following:

- Extensive skills training
- Incentive compensation
- Promotion from within
- Result- oriented appraisals
- Employee participation
- Employment security

#### 4. Conclusion

Indian economy has been showing signs of unprecedented growth for the last three financial years. Buoyant domestic economy has propelled some major Indian companies to acquire foreign companies in the last couple of years. Gradually, as Indian companies are making their presence felt at the global scale, there is a renewed importance to the strategic management of human resources. To compete and prosper at the global level, innovation is something which companies cannot do without. At a stage, when HRM is trying to find a more important and strategic place in the decision-making of a company, a vital role is to be played by it for driving and empowering innovation.

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## Cyber Security For Smart Grids Using Cognitive Radios

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### **Abstract:**

*This paper is motivated and inspired from the National cyber security policy of India 2013 and the upcoming Smart Grids. In this, the approach to bring up the smart grids for human welfare in a secure way is discussed. Further, recent initiatives and the for the communication in smart grids the concept of cognitive radios is discussed which can handle the network architecture of smart grids in intelligent fashion.*

**Key words:** Smart Grids, security, Process Control Systems Cognitive Radios

### **1. Introduction**

Smart Grid is a complex architecture connecting all human made technological developments along with upcoming advancements interconnected within cyberspace [1]. This provocative concept involves uncertain risks from cyber attacks which can be intentional or unintentional, thoughtful or mishaps thereby leading to disastrous impacts. Cyber space involves people, technology and services. To create a secure communication establishment for smart grid network which works with trust and confidence involving electronic talkbacks between network devices is the need of present time to setup smart grid portfolio. This paper looks into those issues which make it necessary to consider the cyber security aspect of grids which include smart and resilient next generation networks.

International forum and bodies on smart grids (like IEEE, ITF etc.) are working on standards[5] and setting up a common platform to communicate between cheap and small devices among each other through wireless and other media access. The dimension of applications for these networks are wide spreading from wireless telecommunications, environmental, medical, monitoring, heating and ventilation sensors, automotives etc. This is planned to be implemented using embedded devices and controllers which will intervene the human survival and living.

The main concern which is of prior importance is the attacks focused to home are networks, advanced metering infrastructures and electric generation utilities. For dealing this, standard based solutions which are well proven in advanced, developed for open architecture have to imbibed in the nourishment and upbringing of smart grids. Addressing all network points with a secure measure and making them recumbent to these probable disturbances for a smooth functioning of smart grids can be made achievable. The rate of common attacks which includes hacking, terrorism, viruses has shown an ever rising trend in past few years, hence intimating the present outrage to develop highly sophisticated tools which can intrude into secure networks through weak-leaky links is a challenge to tackle for smart grid cyber security.

Cyber security of smart grids has been a key concern of the present times and many initiatives have been taken depending upon mainly the geographical origin and type. Cyber security for smart grids is important to prevent and protect smart grids from the attacks aimed at disturbing the communication system protocols on an overall basis. These attacks can damage the system hence protecting them from such attacks, otherwise detecting the incurred attack and responding to it in the best possible resiliency form is the overall perspective which has been aimed to understand by the means of this paper. This needs to be understood as the upcoming technologies for the advent of smart grid systems and solutions, as the two way communication involved in this upbringing of the demand and provisions must be secure in all diversified approaches.

Some of these approaches which can be dealt from the beginning of the upcoming secure smart grids are listed as the following four step model:

- i. **Well framed architectural algorithms for monitoring and analysis:** Within these smart grid communication protocols lots of data streaming will happen from the utilities, control centers, substation hubs, monitorial agencies etc. hence strongly instrumented and carved approaches and algorithms for monitoring and analysis of this is prior need for setting up such grids which are safe from cyber attacks.
- ii. **Detection of probable mischievous activities:** If certain potential abnormalities are observed in the architectural plan of smart grids then certain mechanism should be framed in order to categorize them into threats and dangers which are potentially hazardous.
- iii. **Defense against Cyber Attacks:** Once a categorical cyber attack is detected which can hamper the system stability, methods and procedures have to be undertaken in order to bypass, reroute and protect the remaining network from this disruption. Few of the know algorithms for cyber defense include rerouting, network partitioning and in pursuance of power defense: generation shift, load shedding, reactive power dispatch, controlled islanding are few concepts.
- iv. **Modeling and virtual simulation:** For the per se of the above applicability's we need a simulation environment where we can test and measure the implications of cyber attacks on smart grids and accordingly fortune our thinking and methodologies to tackle such threats.

As the security analysis of smart grids is the prime concern which also associates risk analysis for such system, we require a full proof virtualization of the concept so as to understand the implications of cyber attacks. This can also help in creating shield which in conclusion makes the smart grid automatically forfeit from any of the cyber threats and attacks.

Major concern regarding the security of smart grids is its easy vulnerability to the attackers. There are many factors constraining the roadway to reduce this vulnerability of smart grids. Few of them enlisted below:

- **Dependencies on the legacy systems**

This concern is one of the most stealthy issue as the smart grid backbone lies within the legacy power distribution system which have existed since ages. They will continue to work which at present have insufficient security mechanisms and considerations.

- **Long term perspectives**

Deployment of smart grids would be done keeping a long term perspective in mind which will be more than the life span of usual networking systems hence these system deployments have to be adaptable with the future upgrade and modification capabilities.

- **Inapplicable physical safety**

Smart grid network elements will be more easily accessible from any location instead of substations and can be infected with ease thereby increasing the threat in the cyberspace.

- **Geographically disperse**

The extent of smart grid system on the geographical map would be vast which makes it difficult to manage and maintain creating a error and threat prone web with limited accessibility.

- **Interoperability of proprietary communication systems**

Smart grid systems involves various groups, forums, organization on private and public levels hence an architecture from physical medium to application perspectives should be interoperable in terms of technology and protocols keeping in view all the security aspects.

- **Policy and standards framework**

The present circumstances for security in smart grids lack in international policy and standard documentation, regulations, good and bad practices, economic or financial guidelines, technical detailed analysis, information sharing, research and development on a robust platform. This needs to brought up in a rigorous manner.

Process Control Systems (PCS)[2] are used to control and monitor power grids. Most common PCS for electrical power grid is Supervisory Control and Data Acquisition (SCADA) system. Since the PCSs will be controlling physical aspects of the electric power grid, the security of these systems is very important. When a computer is compromised only the data on the computer is compromised, and in extreme cases some of the hardware in the computer may be damaged. When a PCS is compromised, multi-million dollar equipment can be physically damaged in addition to data being lost. In extreme cases it can cause human injury or loss of life. The most important security objective of the PCS is availability. The electrical power system must be available at all times, so the PCS controlling the power system must also be always available. The integrity of the PCS is the next important security objective. It will not be able to make correct decisions if it is given false data as input. Confidentiality is the least important security objective. The PCS needs to run in real time, and that means the system must have minimal overhead. Implementing confidentiality may be too time-consuming to meet latency requirements.

Keeping in view the above criticalities for understanding the need of security for smart grids , certain measures and initiatives are mentioned considering the present environment in this domain of technological and managerial future research initiatives to make smart grids secure:

- **International agency**  
An association of public bodies from different countries, which support its members, seeks to achieve common goals and collaborates with other similar agencies and even non-member countries.
- **Industry association**  
An association that supports and protects the rights of a particular industry and the people who work in that industry, and which seeks to achieve the common goals of its members. There may be a public entity within these associations, but it does not have a leading role.
- **Public Private Partnership**  
A government service or private business venture which is funded and operated through a partnership of government and one or more private sector companies.
- **Public body:** An organization whose work is part of the process of government, but is not a government department.
- **Regular private organization**  
An organization which is privately run and does not rely on money from the government and funds from charities. They get make their own money by providing a service at a cost.
- **Professional association**  
Also called a professional body, professional organization, or professional society. A professional association is usually a non-profit organization seeking to represent a particular profession, the interests of individuals engaged in that profession, and the public interest.
- **Specialized event**  
Workshops, forums, conferences or summits focusing on cyber security.
- **Online resource**  
A specialized website, blog, e-forum, online group, and similar resources.
- **Project**  
Simulation and virtual projects portraying the security of smart grids.
- **Other**
- When an initiative or an organization does not match with any of the previously defined types, it will be classified with this value.

## 2. Recent Initiatives

The research and development of robust and secure communication protocols, dynamic spectrum sensing, and distributed and collaborative security should be considered as an inherent part of smart grid architecture. An advanced decentralized and secure infrastructure needs to be developed with two-way capabilities for communicating information and controlling equipment, among other tasks, as indicated in the recently published “Guidelines for Smart Grid Cyber Security Vol.1” by the National Institute of Standards and Technologies. The complexity of such an endeavor, coupled with the amalgam of technologies and standards that will coexist in the development of the smart grid, makes it extremely necessary to have a common platform of development, with flexibility and reliable performance.

Field programmable gate arrays (FPGAs) development platforms share these advantages, not to mention the fact that a single silicon FPGA chip can be used to study several smart grid technologies and their implementations. FPGA chips offer significant potential for application in the smart grid for performing encryption and decryption, intrusion detection, low-latency routing, data acquisition and signal processing, parallelism, configurability of hardware devices,

and high-performance and high-bandwidth tamper-resistant applications. A distributed FPGA-based network with adaptive and cooperative capabilities can be used to study several security and communication aspects of this infrastructure both from the attackers and defensive point of view.

Revolutionary communication architecture is required for effective operation and control of smart grid, and cognitive radio[3] based communication architecture can provide a solution. Cognitive radio refers to the wireless systems that are context-aware and capable of reconfiguration based on the surrounding environments and their own properties. In the same frequency range, there are two coexisting systems: the primary system and the secondary system. The primary system refers to the licensed system with legacy spectrum. This system has exclusive privilege to access the assigned spectrum. The secondary system refers to the unlicensed cognitive system, which can only access the spectrum that is not used by the primary system. The primary system refers to the licensed system with legacy spectrum. This system has exclusive privilege to access the assigned spectrum. The secondary system refers to the unlicensed cognitive system, which can only access the spectrum that is not used by the primary system.

## 3. Conclusion

By leveraging cognitive radio technology and imbibing the security aspect into the proposed communications infrastructure promises to utilize potentially all available spectrum resources efficiently in the smart grid environment making them secure and relying.

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## Micro, Small and Medium Enterprises in India: The Challenges of Technology Adoption

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### **Abstract:**

*The Micro, small and medium-sized enterprises (MSME) sector in India is impressive in its sheer size and diversity of industries and services. On the basis of its characteristics the MSMEs sector is described as, “a nursery of entrepreneurship” and the “gateway to global growth”. The 26-million-strong micro, small and medium-sized enterprises (MSMEs) – comprises of one of the most critical sectors in India’s growth story and will play a pivotal role in the country’s economic future. While a portion of the MSME sector contributes to India’s technology industry, MSME manufacturing and service sectors on the whole have not adopted technology to improve their day-to-day business practices – including interactions with customers and employees, marketing and sales functions, or financial management – so that they can further grow their business and compete in an increasingly global marketplace. This paper begins by exploring the MSME landscape, with a specific focus on the technology adoption profiles across the sector. It is narrowly focused on the important topic of technology adoption and is intended to present a comprehensive look at the wide array of barriers that face the MSME sector. An attempt has been made access the profiles of the sector, and the opportunities and challenges it faces, to provide a foundation to examine the use of technology today.*

**Key words:** *Micro, Small & Medium Enterprises, R&D Intensity, Technology profile, barriers to adoption of technology*

### **1. Introduction**

The MSME sector in India is impressive in its sheer size and diversity of industries and services. The Indian Ministry of MSMEs describes it as, “a nursery of entrepreneurship” and the “gateway to global growth”. The sector makes up almost 9% of India’s GDP, 95% of its industrial units, 45% of its manufactured production and 40% of its exports. MSMEs, which are growing at a rapid rate of 9.5 million per year (13% on average compared to the national industrial rate of 8.5%), are responsible for 69 million jobs across more than 26 million businesses. This is second only to the agriculture sector. In addition, almost 50% of MSMEs are owned by disadvantaged groups, including multiple minority groups and women, underlining the inclusiveness of the sector.

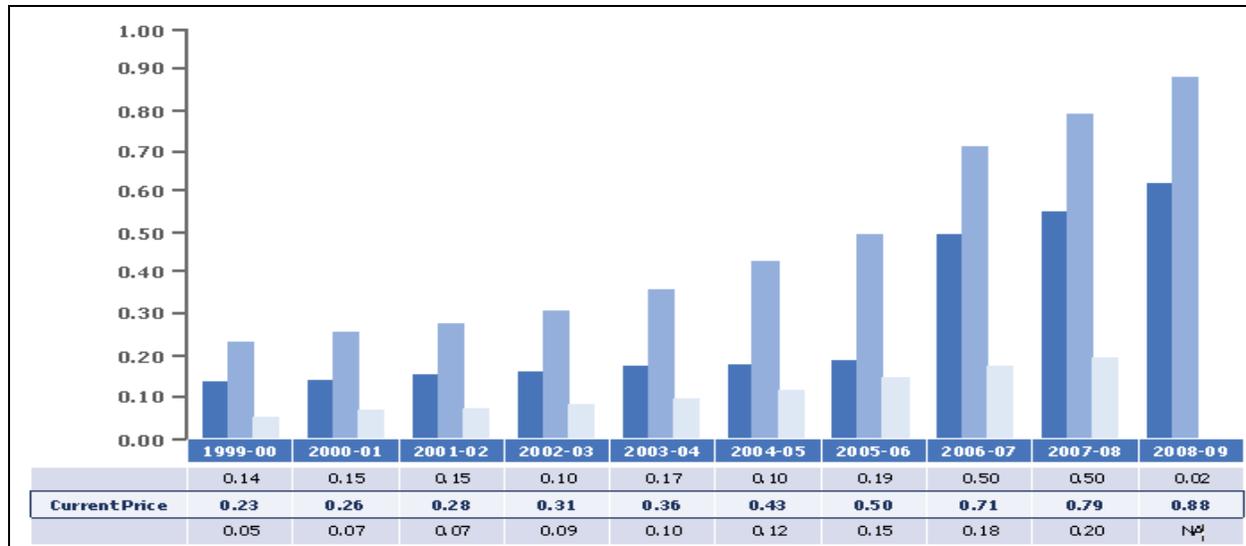


Figure 1: MSME Investment, Production and Exports In MSME Sector  
(Source: Office of the Development Commissioner, MSME, New Delhi 2011)

MSMEs are diverse in terms of size, products and services offered, turnover and technology adoption. The spectrum is broad. On one end are high-growth enterprises in developed sectors, such as textiles and garments, auto components, health care, education and telecom equipment. At the other end are sub-contractors and the more slow-growing informal, small retail and unorganized sector, such as village and cottage industrial units. Remarkably, more than 24.5 million (94%) of MSMEs are unregistered. Thus many of the facts we know about the sector come from a small number of the players, and the true effect of efforts to increase the competitiveness of the sector are much more far reaching than what is “on the record”. In spite of this, many MSMEs act as suppliers to larger enterprises; they contribute to the greater Indian growth story. This situation will only become more entrenched as India increasingly opens its borders and big business, especially foreign enterprises, look for ways to partner with small local businesses in the supply chain. As the Indian economy opens to global competition, MSMEs must find ways to innovate to succeed in this business environment. To remain profitable, it is therefore imperative that MSMEs use economic, government and private sector support to take advantage of trainings and resources to modernise their technology. Nurturing competitiveness among MSMEs by helping them to adopt new technologies will improve productivity, particularly across manufacturing, up and down the value chain (thus resulting in multiplier benefits) and create a more forward-thinking sector capable of sustaining government’s growth projections. If the MSME sector grows as predicted, the manufacturing MSME sector’s share of GDP should increase to 25% over the next 10 years, adding 100 million jobs to the Indian economy.

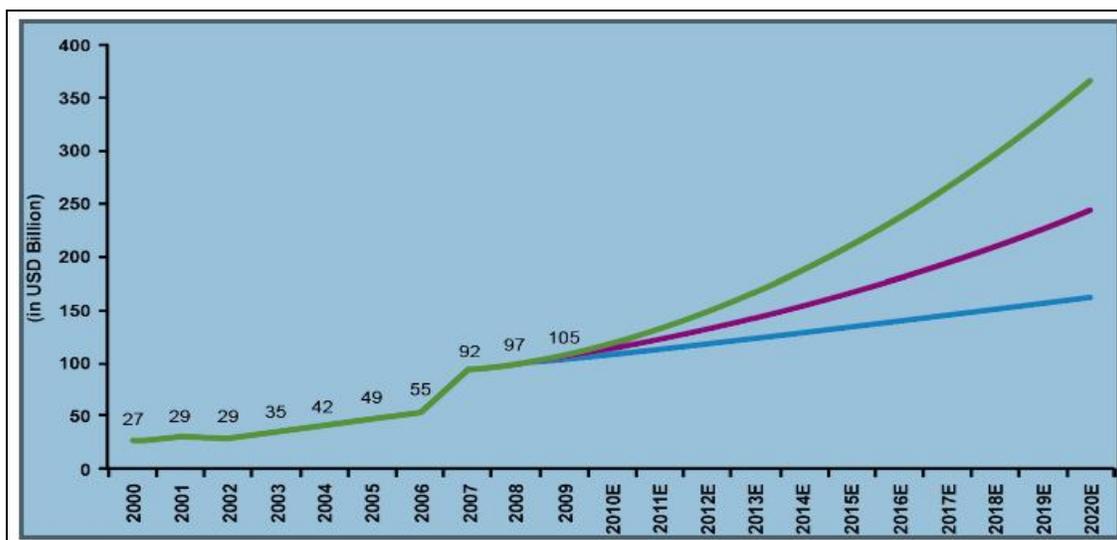


Figure 2: MSME Output Forecast Scenario  
(Source: Grant Thornton. Vision 2020: Implications for MSME, 2011)

### 1.1 The Challenge

Report of the Working Group on MSME Growth for the 12th Five Year Plan (2012–2017) focuses on the importance of information communication technology (ICT) penetration “to enhance the overall competitiveness of the sector as well as the quality of governance” and recognizes the pivotal role of innovation in growth creation. Specifically, the document focuses on using the technology platform to drive good governance, manufacturing competitiveness, public health, universal education, right to food, and right to information amongst others. Yet, as the country raises the bar of industrial sophistication, it is clear that large parts of this sector have not quite made the grade in terms of participating in the India development story. Bluntly put: a majority of micro and small businesses do not reflect The 21st-Century India, in a digital age with its high-tech needs. There are reasons for this. Most MSMEs have a low capital base and management functions often rest with only one or two people. In most cases, they remain rooted to more traditional approaches to business with little to no exposure to the state-of-the art in Indian or international business. MSMEs are generally marked by low to zero R&D, and there are inconsistent levels of professionalism across the sector. This reduces their ability to adapt to changing trends and take risks. In addition to the overall lack of modern management practices, these firms have poor access to a trained workforce, technological information or support. Therefore, they concentrate on reducing costs within existing business systems and structures without benefiting from cutting-edge tools to help even the smallest of businesses. The fact that they are spread throughout the country with little or no access to centers of excellence.

## 2. Technology Profile of Small Business

In collaboration with the Government of India’s Ministry of Micro, Small and Medium Enterprises (MSMEs), the National Institute of Entrepreneurship and Small Business Development (NIESBUD), and the National Small Industries Corporation (NSIC), Intuit, a technology company serving small businesses around the world, wanted to gain a comprehensive understanding of the barriers to technology adoption among micro and small business in India. The findings resulted from an extensive, primary research methodology that included interviews with 748 micro and small businesses across 12 cities in India. The first phase of the research was a qualitative analysis in four cities of 20 micro and small businesses with 50 employees or less to assess how technology is used and outline some possible barriers to technology adoption. This was followed by a quantitative survey in eight cities among 728 micro and small businesses with less than 100 employees to test these barriers and explore existing and future solutions. All participating businesses had a turnover of no more than Rs. 2-5 crores. Medium-sized businesses were not part of the survey pool as the focus of this study was focused specifically on micro and small businesses. The findings revealed that the majority of micro and small businesses had a low awareness of and engagement with technology. Three business types emerged during the qualitative sessions: “tech non-adopters”, “tech aspirers”, and “moderate tech adopters”.

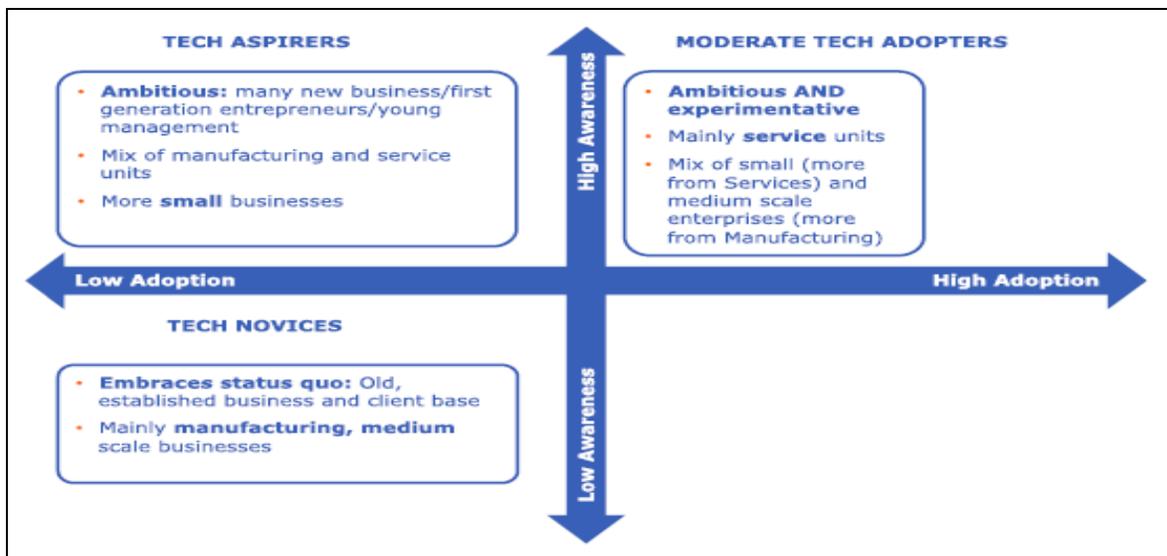


Figure 3: Technology Adoption and Awareness

Tech non-adopters – or “technology laggards” – do not employ technology to any great extent and rely mostly on manual methods. They tend to be older manufacturing, established businesses who practice “old school” business development and management. Tech aspirers represent a mix of service and manufacturing units but tend to be on the smaller size. The business attitude among this group is “ambitious but cautious”, as this group is usually comprised of new entrepreneurs with younger, more inexperienced management. While tech aspirers have a much higher awareness of the benefits of technology than non-adopters, they also exhibit low engagement and only adopt technology solutions when they are tried and tested by others. The final group – moderate tech adopters – is the most technology-savvy of the sampling and uses technology to keep ahead of trends and interact with clients in various aspects of their business, although not always consistently and without struggle. These businesses are mostly found in the services sector. Moderate tech adopters have an evolved understanding and use of technology but this clearly remains at the nascent stage. Although all three

types acknowledge the benefits of using technology, most businesses appear to be applying technology to a limited extent in business operations. Free and guided associations of technology remain in the “functional realm” where technology is viewed as a means to save time and effort. Software usage is basic and dependent on popular products and established brands. Internet and mobile telephone solutions, while used for personal purposes, are surprisingly not employed equally across the business as they are in business owners’ personal lives. Moreover, there is little customization of solutions to meet specific business needs.

### 2.1. The Economic Dimension

The Businesses pay a price for low levels of technology engagement – more labour-intensive work, resulting in greater inefficiencies and higher costs. A market analysis by management consulting and market research firm Zinnov, commissioned by Intuit, shows that disorganized businesses work hard to make ends meet, but manage mostly with pen and paper, outsourcing the more complex tasks. Technology can change this giving management more effective and efficient control over key aspects of the business. According to a World Bank study, firms that effectively use ICT improve sales growth and profitability by 3.4 and 5.1 percent, respectively.

	Enterprise		Difference
	Non IT Users	IT Users	
Sales Growth	0.4%	3.8%	+750%
Employment Growth	4.5%	5.6	+24%
Profitability	4.2%	9.3%	+113%
Labour productivity (value added per worker)	\$5,288	\$8,712	+65%

Figure 4: Effect of ICT Use on Firm Performance in Developing Countries  
(Source: World Bank, 2006)

### 2.2. Barriers to Technology Adoption

Applying the findings from the qualitative stage of the research, the research’s quantitative assessment into the reluctance to invest in and adopt technology uncovered five top barriers: (i) cost, (ii) lack of skilled manpower, (iii) low awareness of the benefits of technology, (iv) security and privacy, and (v) poor infrastructure.

The two-phased research among 748 micro and small businesses across 12 cities in India led to the following key conclusions:

- Cost is the top barrier**  
 Micro and small businesses are not yet convinced about the return on investment in technology adoption. Forty-five percent of respondents highlighted cost as the biggest obstacle. Demonstrating the value add for the business is critical and should be done using cost–benefit analyses and simple comparisons of growth between traditional operations versus IT-based approaches.
- Government and other institutional schemes are benefitting small businesses, but there is a broad lack of awareness of existing resources**  
 Businesses who utilised the numerous government and other stakeholder schemes benefited extremely well from them. At the same time, there appears to be a very low awareness of these programmes among small businesses. Recognition of specific programmes was as low as 1–4 % among the sample interviewed and only as high as 32%. All stakeholders, including the Government of India, training institutions and the private sector, must work together to assess why existing communications about available resources are not reaching the end-user and develop new ways to promote the existing programmes among small business owners.
- Case studies and testimonials are incredibly important in communicating the benefit of technology adoption**  
 Other small businesses have tremendous influence in helping reluctant business owners “get over the hump” and invest in technology. Specifically, 68% say they adopted technology solutions only after seeing other businesses using it to their benefit. Furthermore, 36% of all survey respondents said that hearing from other small businesses about their experiences with technology would be helpful. Government, small business organizations and even private sector communities need to roll out engaging case studies and tap into relevant “influencers” when communicating the value of technology adoption. One way to do this is to generate real small business “success stories” to communicate in local communities.
- Share best practices and engage the community**  
 Small business kiosks, incubators, hubs, clusters, business associations, and support centres, such as the country-wide network of Development Institutes, established by the Ministry of Micro, Small and Medium Enterprises, could be more

active in bringing small business together to leverage skills, ensure resources are user-friendly and help answer IT questions throughout the growth cycle of micro and small businesses.

- **Timing is important**

Moderate tech adopters tended to embrace technology either in beginning stages of forming a company (60%) or when starting to expand (20%). Supporting organizations must “meet the business at its comfort level” – that is, when and where they are mentally and financially open to adopting and investing in technology. Intuit has some additional ideas on specific solutions for both government and private sector that could leverage the open “entry points” for small businesses.

- **Technology adoption must be easier, more affordable, and implemented from a local perspective**

Just less than 40% of moderate tech adopters went forward with IT plans because a credit or upgrade made the implementation affordable. Affordable solutions such as easy installments, credit options, and pay-as-you-go options can provide sustainable solutions toward addressing cost concerns. Additionally, software should be easy to use and offered in local languages to breakdown the perceived complexity of IT.

- **Provide long-term support**

It is essential to offer sustained IT support that meets the needs of the end-user, from a variety of sources including in-person support. Coupling these with user-friendly solutions and baseline IT training will go a long way in helping small business overcome the hurdles to technology adoption.

- **The cloud’s potential is tremendous but customers are not yet convinced of its benefits – and that may be because it is not well-defined among India’s micro and small businesses or those who are providing the solutions**

While many businesses are aware of the benefits of cloud computing – almost 80% of IT users would consider embracing “software as a service” (SaaS) – they are hesitant to do so until issues relating to security and reliability are addressed and communicated. Concerns today may outweigh benefits if those benefits are not well-defined by providers and policymakers, or experienced first-hand by the end user.

- **The case for technology is clear – the reasons to adopt technology are consistent with MSMEs’ top challenges**

All businesses aim to be more efficient, more responsive, have better control over finances, better access to accurate data, and better ways to acquire customers. Technology can facilitate these outcomes, thus underscoring the importance of communicating – and demonstrating – how technology provides MSMEs with better control over their financial future.

### 3. Conclusion

Ultimately, together a set of collaborative stakeholders must better demonstrate the benefits of technology to India’s micro and small businesses so they can succeed in today’s ever-changing business environment. Furthermore, together we must increase micro and small businesses’ access to technology by making it affordable, easy-to-use and ensuring there is the core infrastructure (both physical and skills-based) to facilitate its use. Through innovative programmes, better communication around those technology solutions that work today and a willingness to solve the most challenging problems facing micro and small businesses every day, together we can transform India’s MSME sector.

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## An Analytical Study on Current Level of ICT Access and Its Use in Education Sector: A Wake up Call for Educational Institutions

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### **Abstract:**

*Education is an asset for a society. The education system in India is governed by the Ministry of Human Resource Development (MHRD), and the different Departments of Education at the state level. The government of India has been making various noteworthy advancements in achieving the goals of universalization of elementary education through (ICT). This research work is an attempt to generate awareness among both in teaching and student fraternity employed/ enrolled in an educational institution. This is a secondary research on various policies of ICT run by government of India and by state governments to facilitate virtual teaching, online classes, content development and its delivery and connecting students from remote areas, rural areas along with urban regions. Some of the popular schemes are Sarva Shiksha Abhiyan(SSA), Kendriya Vidyalaya Sangathan( KVS) or Central Schools, Navodaya Vidhayalaya Samiti(NVS), Rashtriya Madhyamik Shiksha Abhiyan, and EDUSAT etc. This research highlights the spectrum of experiences of various schemes launched by government of India and by state government, for school education. It will also include the advantages and some practical hurdles of implementing ICT at primary, secondary and senior secondary school education.*

**Key words:** Education, ICT, MHRD, Teaching and student fraternity, SSA, KVS, NVS, EDUSAT, Challenges, Schemes, Government, Primary, Elementary and Secondary Education

### **1. Full Length Paper**

The education system in India is governed by the Ministry of Human Resource Development along with different Departments of Education at the state level. The government of India has been making various significant advancements in achieving the goals of universalization of elementary education. Since 2001, 'Sarva Shiksha Abhiyan' (SSA), which is known as the government's flagship education scheme, was implemented in partnership with the state governments since year 2001. It has been successful in appreciably increasing enrollments and reducing the gender gap in primary education. With the comparative success of SSA, the government has shifted its focus on universalization of secondary education, in a mission mode, by the implementation of the 'Rashtriya Madhyamik Shiksha Abhiyan'. Another significant milestone in this arena is 'Right to Education' bill, which has been designed to accomplish the task of ensuring equal access to quality basic education for all. It was passed by the parliament in August 2009. It made education a fundamental right for every child in the country.

This research paper is a result of extensive secondary research and would focus upon the current level of ICT in primary and secondary education in India based on a descriptive analysis of studies conducted by the Ministry of HRD, World Bank, UNESCO, private organizations like Intel, Azim Premji Foundation etc. This analysis has been done to update the level of awareness among people in general and among parents in specific, who are living in Indian society.

This research provides a secondary study of trends and dominant features of the use of ICTs for school education as profiled in different initiatives captured in the country reports. The paper also examines the inputs and challenges in the effective implementation of ICTs in school education. It provides suggestions to deal with these challenges and help the implementation of ICTs in school education. It is observed that new technologies are being incorporated with the older technologies to make ICT applications in education more effective. Educators are also exhibiting interest to use mobile technology to enable access to education. These consist of learning objects from digital Web-based resources, formed to bear learning and can function as discrete entities or be linked in order to relate to clear concepts or learning outcomes. These digital resources are stored in the repositories that function as libraries,

and provide information to the teachers, students and parents. These are structured and organized to facilitate the finding and employ learning materials regardless of their source location.

## 2. Information and Communication Technology Schemes for Schools

The ICT Schools scheme was launched in 2004 by government of India, with a vision to provide opportunities to students to develop their ICT skills and to enhance the use of ICTs to aid the teaching learning process. This scheme supports the procurement of computers, peripherals, software, connectivity, digital laboratories etc. The scheme is presently being implemented in all the states and union territories of India, in each government and government-aided secondary and higher secondary schools. It has become a popular and compulsory feature of almost all private schools whether affiliated to ICSE, CBSE or state board. The scheme aims to set up SMART schools in addition to basic ICT equipped labs, in Kendriya Vidyalayas and Navodaya Vidyalayas, both central government school systems, which will act as "Technology Demonstrators". It can guide to diffuse ICT skills among students of neighboring schools.

## 3. Sarva Shiksha Abhiyan

Sarva Shiksha Abhiyan is a main programme of the Government of India in partnership with the state governments to enhance creative development, and, to strengthen the formal primary and upper primary school systems. SSA started as a pilot mission for certain time period, with the objectives of ensuring universalization of Education that would bridge gender and social gaps by 2010. The SSA program is largely funded by the Government of India and it is also supported by the World Bank, the European Community, and Department for International Development.

**4. EDUSAT (Education Satellite)** is designed to provide distance education within the states as an effective aid for school education. Distance education functions as a catalyst for expediting SSA. Management Information System tool of SSA is a remarkable part of the project as it monitors the physical and financial parameters of the scheme. The system works on various modules viz. District Level, State Level, and Ministry Level modules. Role-based access control is given at each level, for different functions right from entering relevant school level data, to, generating and reviewing consolidated data at school, district, and state level.

The basic MIS functionality has been worked successfully in some states like Orissa and Uttar Pradesh by introducing features like GIS, Child Tracking etc. In 2007-08, the District Information System for Education was found operational in 624 districts in the country and it had collected information on 1.25 million institutions providing education at elementary level, with more than 5.61 million teachers.

Central government schemes such as ICT @ Schools, SSA, and Mission on Education through ICT are getting popular and are being used by almost all educational institutions, with significant number of students enrolled in open learning systems at the school and college levels. In addition to these central government schemes, state governments too, have their own major ICT-related projects in educational institutions.

Some examples of education initiatives using ICT in different states are:

**"Chalta-Phirta Mobile Bus"**: It is a bus equipped with a television screen, computers, multimedia facilities, a book library, a blackboard/ white board and toys. It is especially designed to facilitate the slum clusters of New Delhi where children do not have a direct access to education. Each bus has at least two teachers specially trained to educate children through books, computers, exhibitions, videos, films et cetera.

**"Eklavya computer-aided self-learning"**: It is a new practice, initiated by the government of Chhatisgarh, to provide fully animated multimedia software based on textbooks of classes 6,7& 8. These soft wares have been loaded on touch screen computers, which are kept in the school corridors for easy access by children.

## 5. Teacher's Training or TOTs (Train the trainers)

ICTs have offered an opportunity to teachers of schools, to transform their practices by providing them with improved educational content and much more effective teaching and learning methods. ICTs advance the learning process through the provision of more interactive educational materials that enhances learner's motivation and facilitate the easy gaining of basic skills. The use of various multimedia devices like television, videos, and computer applications have created more demanding and engaging learning environment for students of all ages.

In twenty-first century, there is a need to shift, the stereotyped traditional form of teaching and learning, from the traditional teacher-centered pedagogy to more learner-centered methods.

Active and joint learning environments facilitated by ICT, add to the creation of a knowledge-based student fraternity. ICT can improve education leadership, management, and governance by enhancing content development and by supporting administrative processes in schools and other educational institutions.

**6. EDUSAT (Education Satellite)**, the first Indian satellite built exclusively for serving the educational sector, had been launched by the Indian Space Research Organization (ISRO). It was launched with the vision of serving the need for an interactive satellite to enhance the distance education system in India. Many projects have been initiated to impart education through the EDUSAT e.g. the Virtual Classroom Technology on EDUSAT for Rural Schools (VICTERS) program is one such initiative. Another example of such

program is “IT @ School”, a project initiated by Kerala State Government, envisioned to connect the EDUSAT satellite to train teachers, to provide high-speed net connectivity to schools, and to implement learning management solutions.

The Rajiv Gandhi Project for EDUSAT Supported Elementary Education (RGPEEE) is another important initiative aimed at enhancing the benefits of EDUSAT. It is a collaborative project of Ministry of Human Resource Development (MHRD), Indira Gandhi National Open University (IGNOU), and ISRO. This project aims at promoting the use of EDUSAT in teaching fraternity, to incorporate ICT in elementary education. It is operational in Madhya Pradesh, Uttar Pradesh, Chhattisgarh, and Bihar.

### 7. Navodaya Vidyalaya Samiti

Navodaya Vidyalaya Samiti (NVS) is an autonomous organization, run by the Ministry of Human Resource Development, Department of Secondary & Higher Education Government of India. It was shaped with an idea of providing quality education to the rural population who has been underprivileged of quality modern education usually available in urban areas. It is an attempt to recognize and implement the goal of setting up residential schools, to bring out the best of rural talents, mentioned in the National Policy on Education 1986. These residential schools are commonly known as Jawahar Navodaya Vidyalayas (JNV). NVS has incorporated a number of ICT facilities in each of the 576 schools stretch across the rural areas of the country.

### 8. Kendriya Vidyalaya Sangathan

Kendriya Vidyalaya Sangathan (KVS) is also an autonomous organization of the Ministry of Human Resource Development that aims at catering the educational needs of the children of transferable Central Government Employees along with Defense Personnel and Para-Military forces by providing a common programme of education. KVS governs the responsibility of establishing and maintaining Kendriya Vidyalayas (Central Schools). At present, the number of KVs is 978 in India with one school each in Kathmandu, Moscow, and Tehran. Over the last 4 years KVS has made wide-ranging efforts to promote ICTs in its schools. An example of this is Project “Shiksha” (literally meaning knowledge), initiated by KVS in collaboration with Microsoft to implement teacher training programs as well as to monitor the effectiveness of the training programs in the schools.

### 9. Project Shiksha

Teacher training under Project Shiksha, aims at acquainting teachers, to use technology in the classroom; they are trained on using visual presentation of theories and concepts in the curriculum after school hours to ensure no interference with the daily school routine. This kind of training lasts for a period of 10 days by working 3–4 hours per day.

### 10. Advantages of ICT

ICT proves to be a boon for children who live in rural and remote-rural locations, have special learning needs, which possess physical disabilities, constraining their access to schools, have dropped out and/or have kept themselves out of school for various reasons, which aim at excellence and fail to get satisfied in the current system. It has made a remarkable progress in following areas-

- Widening the availability of quality education materials
- Increasing access to institutions through distance learning
- Enabling a knowledge network for students
- Teacher’s Training
- Merging New Technologies with Existing Technologies in Use
- Enhanced Use of Mobile Technology
- Content Development by Learning Objects and Repositories

### 11. Limitations

- **Availability of Infrastructure to Support ICT**  
It is a great challenge for schools to have availability of adequate infrastructure to support the deployment of ICTs. High initial cost of purchasing and setting up the requisite infrastructure, the maintenance and upgrade costs are a great hurdle in remote areas. The cost and effort of supporting such infrastructure also emerge as roadblocks to the successful usage of ICTs in schools, especially in poor and remote areas.
- **Funds Availability to Implement ICTs**  
Availability of funds to set up and to start implementing these projects is still an issue of concern for developing countries like India.
- **Capacity Building of Teachers**  
There is a need to get techno savvy teachers so that their potential can be increased by using various contents available at ICT platform.
- **Resistance to Change**  
Resistance is commonly observed while attempting to introduce ICTs into schools, quite often from the teachers themselves, since they may think that they shall become redundant once technology comes in or that it is too late for them to acclimatize to a new environment. Educators themselves may become skeptical about the effectiveness of using ICTs in school education.

- **Lack of Awareness**

There is a general lack of awareness about ICTs in education, its utility, and how they can be accessed and utilized economically and effectively. This lack of awareness and knowledge about ICTs and their use in education, is observed even on the part of policy makers, administrators and educators, hence, makes it on the whole difficult, to deploy ICTs in the field of school education.

- **Internet Usage**

There are both the sides of coin as Internet contains tremendous potential for education, it also has its own pitfalls. For example, facilitating all the students with Internet access is an expensive proposition for most Government schools. This is witnessed more in rural centers and remote areas, where Internet connections are often erratic, if available at all.

- **Language Barriers**

English is the foremost used language of the Internet. It is estimated that 80 percent of online content is in English. A large percentage of the educational software produced in the world market is in English.

- **Monitoring and evaluation:**

Most of the issues, and problems associated with ICTs in education initiatives are known by policy-makers, donor staff, and educators. However, maintenance of data on the nature and complexity of these issues remains limited, because the system lacks good monitoring and evaluation tools and processes.

## 12. Conclusion

According to Promoting the Use of Information and Communication Technologies for Primary and Secondary Education: The Case of the States of Chhattisgarh, Jharkhand and Karnataka in India' Discussion Paper by Amitabh Dabla, Educational Development Centre, Bangalore India, it has been found that one of the biggest hindrances in the implementation of ICT programs in schools in India is the availability of technology. This is specifically true of rural India. In Tier 1 and Tier 2 regions of India, the appreciation of technology has been rated high as per surveys.

In order to prepare students more effectively to participate in ICT-driven education, greater commitments and willingness to share and adopt innovative solutions are urgently needed from all aspects of society be it Governments, the private sector, communities, donors, parents, and students. All schools should be transformed into active learning environments open to their communities. Telecommunication and power infrastructure policies should aim at schools as starting points for rural transformation; trainers, teachers and students should be empowered to be creative and should act as catalyzing agents for change in their schools; and leaders must cuddle a vision that will set up their youth for tomorrow's challenges.

Despite the challenges mentioned in the paper, ICTs are being increasingly used in education in both the developed and developing world, in order to connect children from poor and remote communities, render them a quality education, and in general equip both teachers and students with a wider range of educational resources to have greater flexibility. Hence it can be said that, the growth and success of ICTs in education depends on the extent to which the issues and challenges mentioned in this paper are addressed.

The success rates of various ongoing ICT programs in schools in India do show a ray of hope for the future. However, academicians are of the view that despite the beneficial opportunities for education that the ICT programs provide, they cannot be considered as a substitute of formal schooling. The role of technology is to support school education and not replace it, though the technology may play an appreciable part in meeting the needs of children who cannot go to a conventional school. Access to ICTs ensures enhancement of traditional or formal education systems, enabling them to adapt to the different learning and teaching needs of the societies.

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