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A STUDY OF VALUE OF HUMAN RESOURCE ACCOUNTING IN STRATEGIC PLANNING & DECISION MAKING

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ABSTRACT

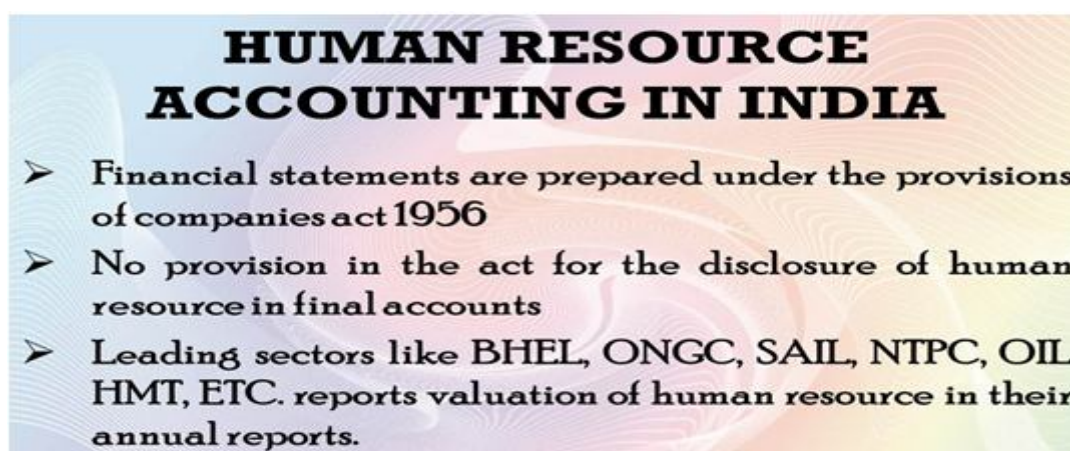
Human resources (HR) and accounting are both crucial areas in most companies, yet they often operate in silos, functioning independently. But more and more businesses are realizing this practice needs to change, and there's a growing recognition of the critical role that employees play in the financial success or failure of a company.

Under the traditional business model, employees were often considered an expense. The cost of salaries, benefits, hiring, and firing received much more attention than the critical contributions that employees made to the company. Now, as companies better recognize the role that employees play in business success, things like employee output, knowledge, creativity, and problem solving are valued more highly and are seen as critical revenue-producing or profit-contributing assets.

Keywords: TDABC, SMART, HRD, HRA.

INTRODUCTION

This growing appreciation has led to increased focus on human capital management strategies in order to maintain, protect, and expand employee resources. There are three major steps you can take to align HR efforts more closely with the company's financial systems: (1) realign company strategy to incorporate improved human capital development and management, (2) develop a dynamic recruitment program that aligns with company strategy, and (3) develop new measures of success and improved employee retention systems. The end result most likely will lead to increased profitability and greater business success.



STRATEGY REALIGNMENT

When forming a new company, discussions often focus on vision, profitability, and strategy. These conversations typically result in a clear definition of the problem the business is attempting to solve. In these early stages, it's also common to draft plans to target potential customers. But goals for supply, demand, and sales are only part of a successful strategy.

A more comprehensive business plan also needs to include several considerations traditionally thought of as HR issues: hiring strategies, employee development and retention programs, and efforts to ensure the right people are placed on the right teams with strategic, aligned management. It's also important to define what success looks like in both financial and human terms.

To improve human capital management systems, begin by incorporating the role of employees into the business strategy. For example, the finance team can help look at historical numbers to create written goals for the leaders of each department. A company should define the role of support staff for the sales team to illustrate precisely how their day-to-day work effectively supports the company's goal of increasing sales.

Darren Root, CEO of Rootworks LLC, suggests starting by defining the ideal workday for employees and managers alike. For most business owners, the ideal day provides them with clarity on priorities, enabling them

to focus their energy and thoughts on what they do best. This allows their activities to be tied more directly to the company's strategic goals for the most part. And, remember, to retain employees, the workday should end at a reasonable hour.

CLIENT RELATIONSHIPS

The alignment of people with strategy also extends to the interactions between the business and external clients.

When developing effective advertising campaigns, marketing executives often begin by defining their audience. Apply this same type of exercise when developing or updating business plans. In this case, the goal is to determine the traits of an ideal client.

The personalities of clients are important. Good relationships often occur when companies align themselves with organizations that share similar visions, cultures, and values. Locating partners based on these traits can be as important as economic factors. If, as part of the sales process, leaders come across people they like, that same appreciation and respect will likely carry over in serving the client. If a company's employees are considered a critical asset, it should be important to locate clients with a similar mind-set.

DYNAMIC RECRUITMENT

Developing a more people-focused business strategy makes it that much easier to recruit the right individuals to implement that strategy. And the importance of having the right people in place can't be overstated. While people are a company's greatest asset, job turnover is its biggest expense (see "Employee Turnover: Financial Impact and Human Impact"). Studies have shown that replacing an employee can cost on average as much as 200% of the base salary of the previous employee in that same position.

The costs are high because hiring and retaining talent involves several components. It begins with the costs associated with attracting the right candidates. Then there are costs associated with training and developing employees after they're hired. Performance management is critical in all businesses, but assessment and improvement efforts also cost money. Employee engagement helps companies retain top talent, and it's an expense that must be considered when replacing personnel. Finally, there are the costs associated with developing employees so they can advance and grow while remaining with the company.

Beyond financial losses, job turnover can be costly in other significant ways. It often leads to lower morale, which can reduce the overall quality of work and diminish innovation from all employees. Productivity losses are also a common result because most businesses, particularly smaller ones, rely on company-specific knowledge gained over an extended period of time. And customer satisfaction and retention also can be affected by employee turnover.

All of these factors are particularly relevant to small businesses. Because most companies are based on relationships with people, the failure of many small businesses can often be traced back to employee turnover.

Simply offering the most money isn't enough to attract and retain top talent. A dynamic recruiting strategy considers several elements, including maintaining a positive work environment, identifying the driving motivations for employees and prospects, and defining the core values and personality traits needed for success within a position.

When Insperity collaborated to implement these strategies at GrowthForce, turnover was reduced and resulted in an average employee tenure of at least five years, which led directly to building strong recurring profits. While it's unrealistic to assume all employees will stay with a company for a long period, an average employment of five to seven years is a sign that an employer has a sound recruitment strategy and great company culture.

CULTURE AND EMPLOYEE DEVELOPMENT

Before beginning the search for the right employees, a company should have a formal training program in place. Policies and procedures must be created, and coaching leaders should be identified and trained.

The goal for all companies should be to create a safe environment for people to work and thrive in. Seek to hire leaders who understand life's challenges and who will work with employees and be flexible when needed, as long as the work is getting done.

A good work environment also features a culture that removes the fear of making mistakes. At the same time, of course, it's also important to manage quality. One effective strategy for creating this balance is to have a position within the organization that interacts with staff on a daily basis to ensure quality and uniformity of work.

IDENTIFY EMPLOYEE MOTIVATIONS

Once the training program is established and the right culture is in place, it's time to begin the search for candidates. At least four generations of workers currently are in the workforce, including Millennials and Baby Boomers, so a company must find out what its prospective employees value. With such a wide range of workers, this can vary considerably. Are they pursuing a career or simply looking for a job? Do they want to have fun at work? Are they interested in having a company invest in their technology skills?

While their motivations may vary widely, most people want to work for a company that cares about them. Going back to the importance of culture, employees don't join a company to live in fear of an angry e-mail or phone call from a manager or a valued client. People join companies and quit bosses. With that in mind, a company's goal should be to create a unique culture and meaning within the organization. The company must provide clear reasons that would make people want to work for it.

A good start is to define the motivations of prospective employees and list the financial and nonfinancial benefits of working for the company. This can be of great assistance down the road. For instance, it will be easier for interviewers to generate more meaningful interview questions that help identify the right candidate for the job. Interviews should begin by asking questions centered on the candidate's values and mind-set before progressing into skill sets and experience. This will identify those candidates most likely to be in alignment with the client acquisition and retention strategy at the core of the company's business plan.

DEFINE CORE VALUES AND PERSONALITY TRAITS

In addition to understanding the motivations of prospective employees, it's often a good idea to proactively consider skills and personality traits when listing the criteria for ideal hires. This not only helps ensure that the right people are hired for the right job, but envisioning the ideal candidates also helps determine where to look to find the perfect match.

Candidates who enjoy solving problems often become top performers. In an accounting department, managers might look for people who are accountable, enjoy working as part of a team, and are passionate about gaining more knowledge. Knowledge-seeking workers gain considerable job satisfaction when their ideas or contributions to a strategy lead to direct revenue or profit improvement. And if the decision comes down to a candidate with a higher skill level vs. one who is a better cultural fit, it's almost always better to hire the person who best fits the culture. Hire employees for attitude. Train them for skills. Skills and problem solving can be taught, but it's difficult to change an individual's attitude.

As a trusted business advisor and HR company, Insperity helped Growth Force develop the core values for potential employees, which were defined as being SMART:

S – Snap (great problem-solving skills)

M – Meaning (love using accounting to serve small business)

A – Accountable (say what they do and do what they say)

R – Resourceful (self-starters who seek out knowledge)

T – Team (prefer working collaboratively)

When interviewing potential candidates for an accounting position based on SMART characteristics, use behavioral interview questions to identify individuals who can cite specific examples or explain how they solved an internal company or client problem. These individuals tend to speak passionately about their work or overall profession and often provide concise responses that include real-life examples without being prompted by interviewers. SMART individuals refer to team efforts and often use the word "we" instead of "I." They are quick to point out collaborative work with other team members in achieving goals. Hiring managers should look for the candidate who can connect the dots from idea to strategy to profits and who becomes more enthusiastic about a role that gives him or her that opportunity.

Also remember the generational differences. When recruiting team members from either Generation X or Y, place an emphasis on seeking candidates who hope to work with inspirational people as well as candidates who are interested in achieving work-life balance. When targeting Baby Boomers, keep in mind that they are interested in comprehensive health insurance coverage and retirement plans. They also are frequently described as being interested in working with managers they respect.

IMPROVED EMPLOYEE RETENTION

One popular format for tracking success is a company scorecard or dashboard report (see "Dashboard Design" in this month's issue). While traditional dashboards focus solely on financial matters, an increased alignment

between HR and accounting allows for the inclusion of both financial and people-based metrics in tracking overall company health. Whenever possible, look for ways to measure and report the connection between employee productivity and progress toward company goals. For example, an expanded scorecard might track sales figures and service indicators as well as employee performance and retention.

EMPLOYEE RECOGNITION

It is often said that the best salespeople are motivated by both money and recognition. Tracking and identifying exemplary sales efforts are easy. Workers in other departments crave the same recognition, but their contributions often can be much harder to measure and are rarely communicated. When it comes to employee retention and preventing the negative human and financial impacts of turnover, employee recognition is one of a company's most crucial tools. But no two employees are the same. As a result, when recognizing employees, a company should know what those employees value the most: time or money. If the answer is time, one popular perk is flex-time Fridays.

When it comes to recognition, incentive compensation must be tied to results, not activity. Also, there should be a line of sight between employees' activities and the results they are measured on. Incentive pay must correlate to the key drivers of the business and the recently updated business plan.

Developing incentive pay measures for service employees is a much more difficult task. Having access to accurate job costing data is essential. Time-driven activity-based costing (TDABC) helps to automatically allocate labor costs to the clients or projects the employees are working on. This provides a view of real profitability by client, project, and employee.

Businesses need concrete ways to measure both customer and employee satisfaction. They should closely track unplanned employee turnover and recognize that planned turnover should be expected and is natural. Planned turnover can be easily identified and managed when managers have regular, honest discussions with employees about their career goals.

Incentive plans should be structured with three levels. The first level is a baseline goal, below which nobody gets a bonus. Next is a budget goal. This level is a target incentive compensation goal the company can afford and is in line with its competitors. The final level involves stretch goals. These can be determined by identifying additional key business drivers, which are then tied to an incremental goal.

DEVELOP BRAND AMBASSADORS

Everyone in the company must be able to identify precisely how his or her job is tied to the company's strategic goals, such as revenues, profit, and customer satisfaction goals. Each person should also have individual goals that help achieve the larger company goals. Manager incentive pay should be closely tied to department and company goals. Individual incentive goals should be closely tied to individual goals. Finally, incentive pay should be given out quarterly instead of annually so that the positive impacts are realized year-round. This also helps normalize company cash flow and expenses.

The valuation of human resources with the help of three approaches namely: - 1. Historical Cost Approach 2. Replacement Cost Approach 3. Opportunity Cost Approach.

1. Historical Cost Approach

The actual cost incurred on recruiting, selecting, training and developing the human resources of the organisation are capitalized and written off over the expected useful life of the human resources. That is the cost of acquisition viz. recruitment, placement together with development costs of personnel are capitalized and written off over their effective serviceable life. Any employee leaves the organisation the associated costs are written off to Profit and Loss Account as an expense.

Merits

1. Easy to work and simple to understand.
2. It follows the concept of matching cost with revenue.

Demerits

1. It is difficult to estimate the period over which the human resource will provide service to the organisation.
2. Assets depreciate in value for various reasons but human resources appreciate in value because of experience, efficiency etc.

2. Replacement Cost Approach

While the historical cost method takes into consideration the costs incurred in the past, the replacement cost method considers the cost that must be incurred to replace personnel already employed. Accordingly, this method aims at adjusting historical cost to current cost.

Merits

1. This approach takes into account the current value.
2. The system is more representative and logical.

Demerit

1. It is difficult to ascertain correct replacement cost to existing human resources.

3. Opportunity Cost Approach

It means that the opportunity cost is linked with scarcity. The value of an employee is determined according to his alternative use. Human resources are evaluated under this method by making an estimate of their alternative use.

It has specifically excluded from its purview those employees who are not scarce or are not being bid by other department. This is likely to result in lowering morale and productivity of the employees, who are not covered by the competitive bidding process.

Objections

The following are some of the common objections against HRA

1. Tax laws do not recognise human beings as asset.
2. There is no generally accepted model for valuation of human resources.
3. Human beings cannot be owned like other assets. Thus, they cannot command any value.
4. The HRA lacks objectivity and preciseness.

CONCLUSION

Proper initiation should, therefore, be taken by the Central Government and the professional bodies in India in respect of formulation of specific accounting standard and suitable valuation models on the measurement and reporting of value of HRs. Though it is not an easy task to enlist the suitable items of HR information, the following items may be reported by an organization in its annual reports:

i. Disclosure of Valuation of HRs.**ii. Disclosure of Employee Costs**

- a) Information of salary with break-ups
- b) Employee costs for different reasons
- c) Manpower development costs
- d) Grade wise distribution of employee costs and
- e) Production hours lost

iii. Disclosure of Productivity/Performance Ratios:

- a) Production per employee (in terms of quantity)
- b) Output value per employee
- c) Value added per employee
- d) Investment per employee
- e) Average age per employee
- f) Employee costs to output value
- g) Value added to HRs
- h) Profit before tax to HRs
- i) Turnover to HRs
- j) Value of HRs to Total Assets (at current cost)

k) HR value to fixed assets (at current cost)

l) HR value per employee

m) Turnover per employee

n) Profit before tax per employee

o) Utilization ratio of manpower

iv. Disclosure of Employee Statistics

a) Employees' classification – based on nature of work, based on qualifications, and based on grade

b) Age –wise distribution

c) Region-wise distribution

d) Unit-wise/project wise distribution

e) Statistical information of employees of weaker section, SCs / STs and other backward classes and handicapped.

v. Other Disclosures

a) Average monthly earnings per employee

b) Average cost of fringe benefits per employee

c) Capital investment on social benefits per employee

d) Social overhead per employee

e) Contribution to national exchequer per employee

f) Awards to employees for their performance

g) Ratio of minimum to maximum earnings

h) Information regarding labour welfare programmes

i) Highlight on man power development programmes

Since there is no specific disclosure pattern of HR value for all enterprises, a format which seems to be suitable for meeting the requirements is presented:

1. **Heading** – ‘Human Resources’ the most valuable assets.

2. **Importance** -- a brief autograph may be devoted as to why computation is deemed necessary. Subsequently if such disclosure is made compulsory by law, the Act and Section may also be mentioned.

3. Grouping According to Age and Profession (Number of Persons):

AGE GROUPS

	20–25	25–30	30–35	35–40	40–45	45–50	50–55	55–60
Managers	--	--	--	--	--	--	--	--
Other executives	--	--	--	--	--	--	--	--
Supervisor	--	--	--	--	--	--	--	--
Skilled staff	--	--	--	--	--	--	--	--
Semi skilled staff	--	--	--	--	--	--	--	--
Unskilled staff	--	--	--	--	--	--	--	--
Total								

4. Specification of retirement age.

5. Grouping According to Income (Number of Persons):

	2000 –3000	3000 –4000	4000–5000	5000–6000	6000 and above
Managers	--	--	--	--	--
Other executives	--	--	--	--	--
Supervisors	--	--	--	--	--
Skilled staff	--	--	--	--	--

Semi skilled staff	--	--	--	--	--
Unskilled staff	--	--	--	--	--
Total					

6. Model Adopted for Computation: [If the present value of future earning model is used then the rate of discount should be mentioned.]

7. Human Resource Values:

Professional Category	Number of Persons		Human Resource Value (₹)	
	Current year	Previous year	Current year	Previous year
Managers	--	--	--	--
Other Executives	--	--	--	--
Supervisors	--	--	--	--
Skilled staff	--	--	--	--
Semi Skilled staff	--	--	--	--
Unskilled staff	--	--	--	--
Total				

So far 28 companies have published its human resources information, these are consists of public sector companies 21 and private sector companies 07 and also the period of acceptance of human resource accounting practice in post- Liberalization period was 21 companies from public sector companies, where as three from private sector companies only four companies were accepted human resource accounting in post liberalization period. The fifteen companies have been following the method of L&S model, 06 companies by L&S model with refinements suggested by Flamholtz, Jaggi and Lau own amended model was one, not reported models were three.

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A CONCEPTUAL OVERVIEW ON STRATEGIES OF EMPLOYEE ENGAGEMENT IN HOSPITALS

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ABSTRACT

We are living in the current age of technology and though the advancement in technology is immense we still are dependent on humans to run it. Human behaviour on the other hand is unpredictable and heterogeneous. Two people do not think similarly and react differently to different situations. In an organizational set up it becomes extremely important that this resource is managed well as the well-being of the organization depends majorly on it. The health of the organization is not only dependent on the financials but also the satisfaction level of the employees working for it.

The level of satisfaction of the employees will enforce the commitment level of the employees towards the organization which in turn will affect the productivity of the same. Thus, proving the importance of positive attitude of the employees has a positive effect on the development of any organization. In service industry where the touch points are human themselves having engaged employees is very critical. Hospitals are one such industry where dealing where the product as well as the service provider are both based on humans. Hospitals are places where the situations of life and death arise every moment and criticality of situations is constant. Hence the employees of hospitals like doctors, nurses, support staff, lab technicians need to be highly engaged to manage such an environment which deals with stress permanently. Handling and dealing their professions which is already mentally exhaustive as well their own personal lives requires very high level of engagement at work.

Keywords: Employee engagement, hospitals

INTRODUCTION

Even if the organization has the best business strategy and plan in place their ideas will fail if they do not have the right people to implement the same. Human Resource focuses on the biggest resource that any organization should concentrate on and that is the employees. Any good idea in books can't be successful if it can't be put to practice and for putting in practice, we need humans who will make that idea work. For example, an organization may be very sound financially but if we do not have a human brain to monitor the cash flow, balance sheet or even the investments effectively the result may be adverse and can put the organization's out of business.

We can view HR from two perspectives. One from the side of the manager and one from the side of the employee. According to Beverly Kaye co-author of "Love 'Em or Lose 'Em: Getting Good People to Stay" "Employees do not leave bad companies they leave Bad bosses. Therefore the organizations need to have managers who know how to be effective or rather the organizations need to keep their managers effective so that they do not have a negative impact on the employees, also a lot of changes in business practices and law need to be incorporated as and when new employment acts and regulations change with respect to organizations and it has to make sure that these changes that are relevant to the organization.

Hiring the right person for the right job is another way that the management team can make a difference to the organization. They need to focus on the idea that reduces the turnover and increases retention of employees. They also need to search the right kind of people for the jobs who can do multitasking and then create an environment that they stay. A vigorous interview procedure that can determine if the candidate has the right aptitude, attitude and skills for the job needs to be chalked out and the candidate needs to be judged on the basis of their performance. The teams need to equally concentrate on its employees and act as their protector as well as defender.

They need to make sure that the employee's goal is in path with that of the organization. They are a constant support system for them in the organization. They need to develop benefit programs for employees so that they can attract best candidates for their organization and retain their best people. They need to come up with programs so that their personal growth and goal is in alignment with that of the organization. At the same time they also ensure that the mission and vision of the organization is well incorporated in the work culture of the organization.

In order to fulfil the above-mentioned parameters incorporating employee engagement in the work environment is very essential. It is seen that higher the levels of engagement higher the organisational success. In hospital sector physicians, nurses, nutritionist, support staff, management staff, lab technicians, pathologists etc are all employees. Facing life and death situations is part of the daily routine of these employees. Hence there is an inherent need to be highly engaged in such challenging situations. These employees have to handle the adverse situations of the patients as well as the challenges in their own personal and professional lives. Incorporating employee engagement strategies will enhance their ability and result in effective and efficient working of the hospital.

UNDERSTANDING IMPLICATIONS FOR HOSPITALS

The word hospital is derived from hospitality. It is a public or a private institution where people are treated at their own expense and given preventive or curative advice as well as treatment. It is a place where the health needs of the society are met with all the available infrastructure required for the same. Mental or physical illness can be diagnosed and treated by specialised and trained personnel who are competent to handle the illness. Professionally and qualified physicians, nurses, lab technicians and support staff who understand the needs of the patients and can provide efficient and effective patient care are employed by the hospitals.

Hospitals intend to provide quality patient care. The basic functions of the hospitals is patient care and diagnosis, health promotion and generation of public health awareness. The general hospitals generally have different departments having different units having specialised staff like Renal Unit, Intensive Care Unit, Coronary Care Unit, Plastic Surgery Unit and Burn Unit, Neurological, Urological, Orthopaedic Units, orthopaedics, maternity, paediatrics, geriatrics, etc. The physicians, surgeons, nurses, allied health practitioners, lab technicians etc are the employees of this organisation that hospital sector forms.

EMPLOYEE ENGAGEMENT

Employee engagement is basically the level of passion that an employee possesses towards their work. Employee engagement describes how passionate does the employee feel towards his/her job. The level of enthusiasm of highly engaged employees is very high and the performance is better than those disengaged or less engaged. Highly engaged employees also contribute to better productivity of their organization.

Kahn (1990) has defined employee engagement as “the harnessing of organization members’ selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances”. This definition means that the employee is both physically as well as psychologically active thereby portraying his beliefs and his emotions regarding the organization as well as the members of the organization with all his energies and vigor. **May et al (2004)** identified that the foundations of the workplace dimensions theorized to influence psychological meaningfulness, namely, job enrichment, work role fit and co-worker relation. , psychological meaningfulness has been linked to many important attitudinal outcomes in addition to engagement (e.g. job satisfaction, internal work motivation and turnover cognitions) and behavioral outcomes (e.g. performance and absenteeism).

N. Rajagopal and Sunu Mary Abraham(2007) the Institute of Employment Studies

(IES) has devised a diagnostic tool to illustrate the strong link between 'feeling valued and involved' And 'engagement'. Tools namely, Training, Development and Career, Immediate Management, Performance and Appraisal, Communication, Equal Opportunities and Fair Treatment, Pay and Benefits, Health and Safety, Cooperation, Family Friendliness and Job Satisfaction led to Feeling Valued and Involved which leads to engagement. **Harter et al. (2002)** Relationships were found between unit-level employee satisfaction-engagement and the 5 organizational outcomes: profitability, productivity, customer satisfaction, employee safety, turnover.

Employee engagement is the key to gain competitive advantage and push the organisations towards high performance. It has been found that engaged employees are highly innovative and fast learners. They go an extra mile and put an effort to help achieve goals.

Engagement is also found to take organisations towards achieving their goals and shows high levels of commitment and motivation leading to high retention, profitability, productivity and customer satisfaction. They feel responsible towards their organisations and work towards achieving organisational goals as their own.

We can thus summarise that employee engagement is the key factor for any organisation for successful running in this era of fierce competition.

1. Engaged employees increase productivity: Employees who are engaged are more dedicated and invested in

their profession and boost productivity. A Gallup study indicated that the engaged employees are 21% more productive than those who are disengaged. According to Ann Latham, writing in Forbes “Engagement is, at best, a *symptom* of success. Employees who are succeeding and feeling good about their contributions to your company are naturally more likely to be proud to work for your company, be happy to come to work each day, and feel valued.”

2. Engaged employees boost customer satisfaction: Engaged employees transfer their job satisfaction to the customers. They are so passionate in their jobs that the customers get infected with their positivity. Quatrz says, “more inclined to put in the effort that translates into buzzing productivity levels, a happier sales force, and a more credible product pitch.” Customers have better sales experience with engaged work force and remain satisfied.

3. High job retention: Engaged employees are self-motivated and happy and have lesser tendency to quit. They are involved in their jobs and are less likely to look out for other job options. Sometimes even the best people are not engaged. But engaged employees will always stick to their jobs and the organization has better retention rate.

4. Boosts Organization work culture : Engagement instills encouragement in organizational work culture. When engagement flows from top to bottom in the organization the complete work force seems to show positivity which leads to efficient working of the organization and results in positive outcomes and productivity.

IMPORTANCE EMPLOYEE ENGAGEMENT WITH IN *HOSPITAL SECTOR

Hospitals are organisations which deal in adverse and stressful situations on regular basis. Administrators can't forget that patient care is delivered by their employees. Engaging those employees around the behaviors and skills that drive clinical excellence and a positive patient experience is going to be a key factor in determining whether a hospital thrives – or even survives – in this new environment.

Graham Lowe (2012) examines how job, work environment, management and Organizational factors influence levels of engagement among healthcare employees and identifies the main drivers of engagement, findings show that a high level of employee engagement is related to retention, patient centered care, patient safety culture and employees' positive assessments of the quality of care or services provided by their team. The results show a consistently strong relationship between Employee engagement and organizational performance.

Max Caldwell (2012) concludes that health care providers are poised to experience tremendous change in the next decade, and thriving in the midst of this change will require a highly engaged, high-performing workforce. Health providers will need to focus on leader led change, role of the manager and development opportunity and other important factors, of course, including rewards and recognition, well-being and internal communication. **Gallup (2014)** studies say that for healthcare providers and their employees, ongoing uncertainty can lower employee engagement, which in turn can have a negative effect on organizational success and patient care. To build and sustain an engaged environment they need to Select employees based on talent, invest in ongoing employee development and Emphasize engagement from the top down. Harvard Business Review shows the drivers of engagement in the US healthcare industry.

DRIVERS OF ENGAGEMENT IN THE U.S. HEALTH CARE INDUSTRY

LEADERSHIP	STRESS, BALANCE AND WORKLOAD
Is effective at growing the business	Stress levels at work are manageable
Shows sincere interest in employees' well-being	There is a healthy balance between work and personal life
Behaves consistently with the organization's core values	Work arrangements are flexible
Demonstrates trust and confidence in the job being done	Work groups have adequate staff to do the job
GOALS AND OBJECTIVES	CAREER DEVELOPMENT
Employees understand the organization's business goals and steps needed to reach them	Employees have opportunities for personal development and advancement
Employees understand how their jobs contribute to the organization achieving its goals	Organization provides career planning tools, resources, and training
SUPERVISION	
Managers treat staff with respect	Managers act in ways consistent with their words
They encourage new ideas and ways of doing things	They lead effective career development conversations

SOURCE TOWERS WATSON

HBR.ORG

A Research Summary for Healthcare Human Resources Leaders (2012) reveals in its studies that the most dramatic way to improve the quality of patient care and patient satisfaction is to take immediate action to increase the engagement levels of healthcare employees. Recognition and incentive programs have proven to be extremely effective in increasing engagement while delivering a high return on investment.

Impact of Higher Employee Engagement		
Effects of Higher Employee Engagement Levels on Employees	Effects of Higher Employee Engagement on Patients	Effects of Higher Employee Engagement on Financial Performance
<ul style="list-style-type: none"> • Improves employee productivity • Improves relationships with management • Reduces job stress • Increases employee satisfaction • Increases retention & loyalty 	<ul style="list-style-type: none"> • Improved care quality • Increased patient satisfaction • Increased patient loyalty • Improved word-of-mouth recommendations of the organization 	<ul style="list-style-type: none"> • Lower employee recruitment, retention and training costs • Higher patient loyalty to the organization • Lower costs related to the delivery of patient care (because of shorter patient stays)

Increasing Employee Retention, Involvement & Effort	
Hospital "Best Practices"	Ways to Improve
<ul style="list-style-type: none"> • Recognition of employee milestones and accomplishments • Family-like atmosphere among long-term employees (good co-worker relationships) • Financial bonds including salary and benefits 	<ul style="list-style-type: none"> • Better communication of goals and decisions from corporate and between departments • Empowerment/involvement in decision making • Improve work relationships between supervisors and their departments and physicians and nurses

EMPLOYEE ENGAGEMENT STRATEGIES IN HOSPITAL SECTORS

After understanding the importance of employee engagement in hospital industry it is evident that for successful working of the hospital the employees of the hospital being physicians, surgeons, nurses, lab practitioners, dieticians all need to be highly engaged. Hence the administrators of the hospitals have to incorporate strategies to keep their staff motivated as the direct implication is on patient care as well as the productivity.

Leaders recognized that an engaged workforce would be more emotionally connected to the hospital's mission workforce, this healthcare organization implemented three key interventions: and willing to go the extra mile to meet and exceed expectations. To build and sustain an engaged

1. **Select employees based on talent.** To accelerate success, hospital leaders began using Gallup's scientific approach for sourcing, selecting, and hiring the best employees. The hospital applies Gallup's selection science at all levels -- for nurses, executives, and front-line employees -- to upgrade the organization's overall talent base and because manager selection is the most important decision executives make, the hospital CEO uses a research-based process to select managers based on talent, demanding that all teams have great leaders.
2. **Invest in ongoing employee development.** With the right hiring strategy in place, hospital leaders and managers implemented a strengths-based approach to developing employee talent. Managers partnered with Gallup to rework their performance management systems to focus on employee strengths, encouraging each employee to connect his or her strengths with role expectations.
3. **Emphasize engagement from the top down.** After measuring employee engagement, hospital managers and leaders worked with Gallup to implement the strategy, tools, and solutions to grow engagement. The hospital benefits by emphasizing engagement at all levels. The CEO sets the tone by stressing the importance of building and sustaining engagement, and managers demonstrate their commitment by helping teams set goals and maintaining accountability for meeting them. Managers also ensure that employees know what is expected of them. By implementing these key strategies, this hospital has done more than improve organizational outcomes -- it has taken strides toward meeting its mission to provide patients with the best care possible.

The hospital sector deals with a technically and professionally qualified staff who are competent and proficient in their jobs. It is therefore the Executive committee, management and directors need to deal with the employees accordingly. In order to increase engagement, they need to take following steps.

1. **Opportunity to speak their mind:** It is very important that the employees are heard and listen to attentively as to what they want. It is not only enough to take feedbacks but also knowing their opinions and their

expectations. Their suggestions should be valued and given importance. Feedback if taken in Realtime could prevent the deviations that may occur and could possibly create problem.

2. Problem Solving: Once the feedbacks as well as the opinions have been taken ,the areas that need concentration and action should be analyzed and focused. Steps should be taken to resolve their issues and they should be involved in matters related to their departments. This will boost their morale and they will feel responsible to the organization.

3. Transform: Every field needs constant development. Especially science and technology where the rate of obsolesce is very high with new innovations and inventions coming forward. If technically qualified staff are exposed to such developments and trained for the same, it will enhance their skills as well as knowledge and their ability to perform will increase benefitting not only themselves but also the organization in the long run. This can be a huge factor of engagement and increase retention, Training and development program inform of seminars , conferences, on-job training etc can be arranged for the employees.

4. Engagement from top to bottom: Engagement strategies should be encouraged at all levels in the organizations such that it becomes part of culture. Positivity is contagious and infectious. With everyone feeling engaged around you the working culture develops enthusiasm. The hospital benefits if such a culture exists as every employee needs to work in teams and not in solitude. It is therefore futile if engagement strategies are not not at all levels.

5. Recognition and reward : Recognizing employees for their efforts and rewarding them for the same boosts the morale of the employees. This increases their commitment towards the organization. Their self-esteem gets boosted when they are appreciated for their efforts amongst their peer groups. A recognition program which derives itself from the organizational values can lead to happier workplaces and happier patients by improved retention and a highly engaged workforce.

Developing and managing the employees is an integral part of human resource. Training them to enhance their skills, knowledge to improve their performance and abilities throughout their tenure in the organization. Hiring the right people for the right job at the right time is also a part of this function. The whole process involves in connecting the employees to the organization they are associated with and bring in sync their personal goals with that of their organization providing them the opportunity to adapt to the company's culture and improve performance efficiency. It is evident that in spite of having a sound financial environment the organization can fail if they do not have the right kind of people working for them. High level of engagement aims at synergizing the efforts of employees to work according to the best of their abilities and also how best to bring improvement in them. The organization also gets a clarity on how and where the employees can be further motivated and how best can their efforts be channelized for better outcome.

CONCLUSION

Having a good organization culture is an important aspect of any organization and the responsibility of this lies with the management. Incorporating employee engagement as a work culture and atmosphere give a very positive impact on the performance of the organization. Healthy working environment drives the employees to bring out the best in them and gives them job satisfaction. Engagement reduces various disputes as well as conflicts which arise within the organization at various levels .They are well equipped to take decisions and sort out the matters in hand and handle grievances so that it does not lead to any adverse consequences. Hence a strong engaged team is an absolute necessity for organization to function at its normal pace and work effectively and efficiently.

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EFFECTS OF GOVERNMENT GRANTS ON RURAL DEVELOPMENT: A STUDY**Rupak Karmakar**

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ABSTRACT

India is federal republics which consist of three parts of government such as central, state and local government. Local government consist of two phase one is urban government (Municipality) and another is Rural government (Panchayat). The present panchayat systems was introduced in 1959 on the recommendation of the Balwant Rai Mehta committee. Primary objective of panchayats system was built to improve of community development but latter that its build to work the total development of rural people as well as rural areas. This study shows how the panchayats developed itself as a local administrator of the rural people and how well their funds are manages and fulfilled the requirement of rural development.

Keywords: E-panchayat, Rural Development, Financial Assessment

INTRODUCTION

In India most of the people live in villages and they do not get the minimum basic services what they want. The government of India or state governments can do nothing about the direct basic services whichever rural people want. For that reason India enacted the panchayat act to go for the services towards the villagers. The panchayat systems of India has three levels for functioning the rural areas, such levels are Gram panchayats (village level), Panchayat samitees (block level), and Zila parishad (district level), it is described in 73rd amendment in 1992, to the Indian constitution. The Panchayat Raj System was first implemented by the Rajasthan Government in Nagaur district on 2nd October 1959. Now in India, The panchayat systems are known as local self- government. Local self-government is functioning in three tiers, and this section is represented by the elected by the local people for five year term. All the developmental works of villages are done by the panchayat systems. Now in India, every year April 24 is celebrated as 'The National Panchayati Raj Day'. Now at a glance the overall picture of the Panchayats in India can be depicted as:

Number of Panchayats

Gram Panchayats	247166
Block Panchayats	6283
District Panchayats	595
Total	255044

Source: ruralmarketing.in>policy

Number of Elected Panchayat Representatives

Sl No.	Panchayats	Total No Of Elected Representative (In Lakhs)	% Of Elected Woman
1	Gram Panchayats	29.30	46.04
2	Block Panchayats	1.80	44.67
3	Zila Parishad	0.17	47.88

Source: ruralmarketing.in>policy

This paper makes an attempt to examine how the local governments collect their funds and utilize those funds in several developmental activities and also criticize that how the local government mostly depends on government grants in spite of their own source of revenue.

LITERATURE REVIEW

Rumi Aijaz (2006) observed that urban local governments in India continue to remain plagued by numerous problems, which affect their performance in the efficient discharge of their duties. These problems relate to the extent of participation and rule of law in the municipal decision making process, transparency in the planning and implementation of infrastructure projects, and level of efficiency in various municipal management and finance practices. It is concluded that fresh thinking is necessary to resolve the problems confronting urban local governments in India.

Ranjit Singh and Vinod Kumar (2012) made an attempt to highlight the initiatives of Indian Government in line of reform in Municipal Government such as 74th constitutional amendment act which have provided a constitutional recognition to Municipal government and Jawaharlal Nehru National Urban Renewal Mission (JNNURM). Authors have also discussed the state government initiatives in this regard. In addition to this they

have highlighted the problems of Municipal Government such as finance, immigration and made some suggestions to cure them.

Dr. Rabindra Prasad (2014) in his study examined the role of women mayors, chairpersons and councilors in city's development and local governance. It argues that there is no difference between men and women mayors, chairpersons and councilors as regards to their formal roles. There are areas, however, where women can play a catalytic role in promoting the causes of social development including women and child development. The number of women in the council though critical is not sufficient enough to neither impact the policies and decisions nor empower women. It requires capacity enhancement to build awareness, training, sharpening their skills, motivation and building confidence, and to engage in general and gender-based urban governance issues.

Namita Paul and D Dhanuraj (2016) opined that urban housing is the challenge of every urban poor in India. It includes a review of housing policies that exist today and learning from interactions with different stakeholders involved in the sector on their roles and the issues they face. In addition, five case studies are conducted in Kochi, Kerala, to understand the demands and views of the urban poor on housing and associated services. The fundamental reasons for the challenges are examined and narrowed down to three major factors. The study concludes with suggestive solutions to improve accessibility to housing for the urban poor in India.

Nesar Ahmed focuses that The PRIs in Rajasthan are working under many impediments. This is their second term after the 73rd Amendment Act was passed. The second SFC report has come and devolution according to the recommendations of the same is being made. The PRIs also have grants according to the first SFC and the EFC recommendations. But there is a need to give the panchayats a practical autonomy over the grants being devolved and introduce the concept of planning, instead of just taking proposals in every meeting of ward sabha and gram sabha.

Shashanka Atreya and Alok prassana Kumar in their study highlighted of the legal and regulatory framework governing the financing of ULBs in Karnataka, in an effort to identify and address those legal impediments that restrict the ULBs from being financially independent. The scope of this study is limited to those ULBs which are declared as City Corporations under the Karnataka Municipal Corporations Act, 1976 ("KMC Act").

OBJECTIVES

Following are the specific objectives of our study

- ✓ To analyze the fund this is sanction by the government towards the social objectives of the panchayats.
- ✓ To assess the impact of government grants and subsidies on total receipts of the panchayats.

METHODOLOGY

Data Source

The data which are used in this study is secondary data. The secondary data are collected from published reports, various books, journals and periodicals of Panchayats and governments.

Sample Design

The North 24 Pargana district consists of 22 panchayat samittees. For the purpose of our study we will considered five panchayat samittees namely Baduria, Bashirhat-II, Habra-I, Hingalganj and Swarupnagar by using simple random sampling.

Tools Used

The data which we used in this study are time series data as cross section, because we have selected five different panchayats and their Eight years financial data. We used panel regression (apply Housman test to select the Random effect or Fixed effect model) statistics to how the impact of various sources of government grants on total receipts of the panchayats. Also we used descriptive statistics to analyze the various implications of government grants.

SOCIAL DEVELOPMENTS OF PANCHAYAT SYSTEM

India is a developing country in respect of economic aspect, infrastructural aspect or digitalization aspect. Now rural part of the India also goes to the digitalization process. Panchayats are not far away from the digitalization. Now in E-panchayat systems use of several software application are planned to serve the rural people. Many of them software are used for planning the development program, such software's are Panchayati Raj Institution Accounting Software (PRIASoft), Panchayat Enterprise Suite (PES), Mission Mode Project (MMP), Plan plus, National Panchayat Portal and Local Governance Directory. The Panchayat institutions or local self-government will reduce the burden of responsibility of the state government. The various needs for the rural people, such as infrastructure, maintenance of roads, availability of clean and safe water, drainage system, construction of

school and education facilities, improvement in agriculture sector etc. depend on state and central governments various activities to their grants disbursement. Now a day's panchayats enhance their activities in several section such as employment scheme through SGRY, NREGS, and developmental activities for children through SSK/MSK, social development through PMGY MSDP etc. But all above activities depend on government grants. Without government grants panchayats have nothing to implement. The next points of discussion will be how the funds are managed by the panchayats.

FINANCIAL ASSESSMENT

'Panchayats' are one of the pillars of Indian economy because of their agriculture activities. Rural people are depend on local self-government functionaries, and Panchayats are one of the important parts of the local self-government. It also fulfill the gap between gram panchayats and zilla parishad. The panchayats functionaries depend on revenue generation. The revenue which are collected by the panchayats are divided into two parts, one is own source of revenue and the other is governments grants and subsidies. The governments grants and subsidies are also sub divided in several parts, such as planned fund of panchayat and rural department, non-planned fund of government department and also some specific purpose funds (such as housing projects, health scheme etc.) which was sanctioned by the government of India. Here is the Table-1 which shows how the government grants and subsidies are collected in several years:

Table: 1

PERCENTAGE OF GOVT GRANTS AND OWN SOURCE ON TOTAL RECEIPTS										
YEAR	BADURIA		BASHIRHAT-II		HABRA-I		HINGALGANJ		SWARUPNAGAR	
	GOVT. GRANTS	OWN SOURCE	GOVT. GRANTS	OWN SOURCE	GOVT. GRANTS	OWN SOURCE	GOVT. GRANTS	OWN SOURCE	GOVT. GRANTS	OWN SOURCE
2010	98.23882	0.264435	93.34952	0.28212	95.5147	0.128732	88.37558	1.132957	98.39184	0.432253
2011	97.89107	0.614971	94.37479	0.115721	94.69243	0.210527	95.17302	0.975208	95.54335	0.398087
2012	97.83354	1.111827	89.12666	0.539258	95.26267	0.205643	93.03042	1.1691	92.39577	0.462528
2013	98.74223	0.369042	94.29791	0.114662	93.14097	0.418066	91.60506	0.921706	89.88766	0.322373
2014	98.72658	0.481019	92.65751	0.132566	95.54505	0.118761	94.05015	0.733145	96.07576	0.592389
2015	97.87022	0.997002	79.79335	0.250501	94.36974	0.154532	93.76797	1.291543	93.60541	0.372596
2016	97.70464	0.598301	88.36261	0.283914	94.18633	0.354961	92.74771	1.947032	95.714	0.233574
2017	96.34529	0.50622	97.53876	0.380686	95.20735	0.446619	94.58576	1.269336	95.05636	0.498009

Source: Reports published by municipalities

From the table-1 we see that in BADURIA panchayat the collection of Govt. grants from the year 2010 to 2017 are 98%, 97%, 97%, 98%, 98%, 97%, 97%, and 96% respectively out of total receipts of 100%, and own source collections are 0.2%, 0.6%, 1%, 0.36%, 0.48%, 1%, 0.59%, 0.50% respectively out of total receipts 100%. In case of BASHIRHAT-II panchayat the collection of Govt. grants from the year 2010 to 2017 are 93%, 94%, 89%, 94%, 92%, 79%, 88% and 97% respectively out of total receipts of 100%, also the own source collections are 0.28%, 0.11%, 0.53%, 0.11%, 0.13%, 0.25%, 0.28% and 0.38% respectively out of total receipts 100%. In case of HABRA-I panchayat Govt. grants from the year 2010 to 2017 are 95%, 94%, 95%, 93%, 95%, 94%, 94%, and 95% respectively out of total receipts of 100%, also own source collection are 0.12%, 0.21%, 0.20%, 0.41%, 0.11%, 0.15%, 0.35% and 0.44% respectively out of total receipts of 100%. In case of HINGALGANJ panchayat Govt. grants from the year 2010 to 2017 are 88%, 95%, 93%, 91%, 94%, 93%, 92% and 94% respectively out of total receipts of 100%, also own source collection are 1%, 1%, 1%, 1%, 0.73%, 1.29%, 2% and 1.26% respectively out of total receipts of 100%. In SWARUPNAGAR panchayat Govt. grants collects from the year 2010 to 2017 are 98%, 95%, 92%, 89%, 96%, 93%, 95% and 95% respectively out of total receipts of 100%, also own source collection are 0.43%, 0.39%, 0.46%, 0.32%, 0.59%, 0.37%, 0.23% and 0.49% respectively out of total receipts of 100%. From the above table it becomes clear that most of the fund collections depend on government grants.

RESULTS AND ANALYSIS:

The regression model is

Total Receipts = $c + b_1GOI + b_2OWN SOURCE + b_3PFO + b_4PFP + e$

Fixed Effect Model: (Dependent Variable: Total Receipts, Method: Panel least Square) Table-2

Source: compiled by the researcher

Random Effect Model

(Dependent Variable: Total Receipts, Method: Panel least Square)

Table-3

Variable	Coefficient	Std. error	t-statistics	Prob.
Constant(c)	2564864	3743413	0.685167	0.4978
GOI	1.064346	0.024889	42.76426	0.0000
OWN	2.213120	2.110675	1.048537	0.3016
PFO	1.046206	0.077179	13.55555	0.0000
PFP	0.984166	0.026648	36.93274	0.0000
R-squared	0.984627			
Adjusted R-squared	0.982870			
S.E. of regression	7458954			
F-statistics	560.4139			
Prob(F-statistics)	0.00000			
Durbin-Watson stat.	1.629043			

Source: compiled by the researcher

HAUSMAN TEST

Variable	Coefficient	Std. error	t-statistics	Prob.
Constant(c)	936629.8	3795878	0.246749	0.8067
GOI	1.067526	0.030650	34.82951	0.0000
OWN	0.123318	3.410252	0.036161	0.9714
PFO	1.166952	0.096771	12.05888	0.0000
PFP	1.001959	0.036152	27.71518	0.0000
R-squared	0.988774			
Adjusted R-squared	0.985877			
S.E. of regression	6772657			
F-statistics	341.3045			
Prob(F-statistics)	0.0000			
Durbin-Watson stat.	2.090853			

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.452735	4	0.0219

HYPOTHESIS

HO: Random effect model is appropriate.

H1: Fixed effect model is appropriate.

The hausman test results shown in table- . The results shows that null hypothesis is accepted because probability is less than 5%, which illustrate that fixed effect model is not appropriate. Therefore random model is suitable to explain the equation.

Table-3 shows that Independent variable is positively linked with Dependent variable Total Receipts. When GOI is increased by one unit, total receipts are increased positively by 1.064346 units, it was a significant results, it also support economic theory because the theory is positively correlated with Total Receipts and Government of India grants. Another Independent variable own source are also significant, when own source is increased by one unit total receipts is increased positively by 2.213120 units. Also other two variables which was related to government fund, one of plan fund other than panchayat and rural department (PFO) increased by one unit total receipts also increased by 1.046206 units. It also supports the economic theory that if PFO receipts more than total receipts also increased and other independent variable plan fund of panchayat and rural department (PFP) increased by one unit then total receipts also increased by 0.984166, it also significant. Multiple correlations also indicate the best fit model that R-squared (0.984627) is fit to the regression line. Adjusted R-squared also fits the model which shows the result as (0.982870). The probability of F statistics also gives a significant results, the value of F statistics is less than 5%. D-W (Durbin-Watson stat) also shows the significant results. D-W statistics (1.629043) show that the residuals are independent or not serially correlated.

This panel regression is good for explaining the relationship between the dependent variable and four independent variables under the study.

CONCLUSION

Local self-government is the backbone of grass root democracy in the Indian villages. 73rd amendment of panchayati raj institution has enacted most of the valuable changes for decentralization of power. A study shows that how the panchayats are dependent on government grants and subsidies, without governments fund the development of panchayats are totally blocked. With the help of government grants panchayats develop the agriculture sector as well as economic condition of the area which will help the change of economic scenario of the whole country. But developments of panchayats depend on government grants, dependability of those government grants increased day by day. Rural people want many more of those services which provided by the panchayats. In their several activates, one of them is the adoption of digitalization process which will help the people to connect the overall facilities whichever they want. To fulfill above those services local government requires more fund and also panchayats dependence on government will be increased. In the above circumstances, local government needs to focuses on their own sources of revenue collection, if own source collection increases then panchayats will be able to do their developmental works and independently also to fill the gap between development and funding.

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ISOLATION AND IDENTIFICATION OF A NOVEL LIPASE PRODUCING *STAPHYLOCOCCUS ARGENTUS* MG2 BACTERIUM FROM OIL SPILLED SOIL

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ABSTRACT

The bacterial culture screened for lipase production was identified on the basis of morphological, cultural, physiological and biochemical characteristics as well as phylogenetic tree made using Neighbour Joining method, as a novel bacterium *Staphylococcus argenteus*. This was further confirmed and identified up to species level by IMTECH, Chandigarh and designated as *Staphylococcus argenteus* strain MG2 MTCC 12820. The 16S rDNA nucleotide sequence of the isolate *Staphylococcus argenteus* MG2 determined in this study has been deposited in the (NCBI, US) Gene Bank database under the accession number KY082046. The organism *Staphylococcus argenteus* MG2 showed optimal growth at pH 9.5 which shows its alkali tolerant nature. Optimum temperature for growth was 37°C and was able to tolerate up to 7.5% salt and 5% sucrose concentration. Media optimization experiments revealed optimum carbon source was lactose and nitrogen source as yeast extract. The organism *Staphylococcus argenteus* MG2 was found to be a potential lipase producer and has various other industrial applications.

Keywords: *Staphylococcus argenteus* strain MG2, screening, lipase, 16S rDNA nucleotide sequencing, and phylogenetic tree

INTRODUCTION

Lipases have immense applications in food, dairy, detergent and pharmaceutical industries and are an important group of biotechnologically relevant enzymes (Hasan *et al.*, 2009). The interest in microbial lipase production has increased in the last decades, because of its large potential in industrial applications (Elibol *et al.*, 2000; Kamini *et al.*, 2000). The most appropriate sources for production of lipases are microorganisms which includes bacteria, fungi and yeast. These microbes can produce excellent quality of lipases at low cost and short time (Trichel *et al.*, 2010).

Mostly bacterial lipases are extracellular in nature and are greatly affected by the type and concentration of carbon and nitrogen sources, the culture pH and the growth temperature, the dissolved oxygen concentration (Elibol and Ozer, 2000). Several strains of *staphylococci* have been reported earlier which produce extracellular lipases like *Staphylococcus aureus* (Jaeger *et al.*, 1999; Bacha *et al.*, 2016), *S. caseolyticus* (Volpato *et al.*, 2008), *S. epidermidis* (Simons *et al.*, 1998; Jaeger *et al.*, 1999; Joseph *et al.*, 2006), *S. haemolyticus* (Oh *et al.*, 1999), *S. hyicus* (Van Kampen *et al.*, 1998; Jaeger *et al.*, 1999), *S. warneri* (Pandey *et al.*, 1999; Van Kampen *et al.*, 2001), *S. xylosus* (Pandey *et al.*, 1999; Van Kampen *et al.*, 2001; Mosbah *et al.*, 2005; Khoramnia *et al.*, 2010; Bouaziz *et al.*, 2011). *Staphylococcus argenteus* species is not identified for lipase production till this date.

The search for new species of microbes having the ability to produce industrially important enzyme with novel properties is a continuous process. This study focuses on phenotypic and phylogenetic analysis performed in order to establish the taxonomic position of the isolated strain of *Staphylococcus argenteus* MG2

MATERIALS AND METHODS**Screening of lipase producing bacteria**

Lipase producing bacteria were screened by enrichment culture technique from various samples like oil spilled soil of vegetable oil packing industries and selling shops, slaughter house soil, oil contaminated soil of auto garage, domestic waste water (sewage), spoiled milk and milk cream, spoiled coconut water etc. of Indore city of Madhya Pradesh, India. These samples were enriched by inoculating in Tributyrin broth medium flask (50 ml) containing 0.5% (w/v) peptone, 0.3% (w/v) yeast extract, 1% (v/v) Tributyrin pH 7.0 and 9.0 and incubated at 37°C for 48 h. After incubation, a loopful of growth obtained from each enriched culture sample was isolated on Tributyrin agar medium plates (Lawrence *et al.*, 1967) (pH - 7 and 9) by sector plate method and incubated at 37°C for 48 h. Individual bacterial colonies obtained on Tributyrin agar plates were evaluated by spot inoculation method for their lipolytic ability by measuring the zone of clearance due to hydrolysis of tributyrin by lipase. The isolates can tolerate alkaline pH (alkali tolerant nature) was checked by growing each isolate of pH- 7 Tributyrin agar medium plate to pH- 9 Tributyrin agar medium plate and vice versa. The bacterial colonies showing maximum zone of lipid hydrolysis were selected for further study.

Characterization of selected isolate

The bacterial isolate, MG2 (pH-7) isolated from oil spilled soil of vegetable oil packing industry of Indore region of Madhya Pradesh, found to produce maximum zone of hydrolysis (Table1) around the colony on Tributyrin agar medium plate was selected for further study. It was studied for its morphological, colonial, cultural and biochemical characteristics and 16S rDNA gene sequence analysis.

Identification of selected isolate

The taxonomic status of the selected bacterium MG2 was identified following the criteria laid down by Bergey's Manual of Determinative Bacteriology (Holt *et al.*, 1994). The biochemical tests (Mac Faddin 1980) such as indole production from tryptophan, methyl-red and voges–proskauer tests, simmons' citrate utilization test, urea hydrolysis, production of H₂S from cysteine, various sugar fermentation tests, oxidase activity, catalase test, hemolytic activity test, starch hydrolysis test, casein hydrolysis test were examined. The isolate was further identified up to species level and confirmed on the basis of 1500bp of 16S rDNA gene sequence analysis by Microbial Type Culture Collection Center and Gene Bank (MTCC), Institute of Microbial Technology (IMTECH), Chandigarh, India.

MOLECULAR CHARACTERIZATION AND IDENTIFICATION OF THE BACTERIA**DNA preparation and PCR amplification**

The Molecular characterization and identification of the isolate MG2 was done at IMTECH, Chandigarh lab. Genomic DNA was separated from the overnight grown MG2 culture by using DNA Extraction Solution. Using consensus primers, 16S rDNA fragment was amplified using *Taq* DNA Polymerase. Primers used for PCR amplification were the Forward primer 5'-AGAGTTTGATCMTGGCTCAG-3' and Reverse primer 5'-ACGGYTACCTTGTTACG ACTT-3'. Amplification process was carried out in 50 µl of reaction mixture containing ~20ng Genomic DNA, 1.0µl dNTP mix (2.5mM each), 100ng Forward Primer, 100ng Reverse Primer, 1X *Taq* Buffer A (10X), 3U of *Taq* DNA Polymerase enzyme. The glass distilled water was used to make the volume up to 50 µl. Thermal cycler was programmed as denaturation at 94°C for 5 min followed by subsequent 35 cycles of denaturation at 94°C for 30 sec, annealing at 55°C for 30 sec, extension at 72°C for 2 min with final extension at 72°C for 5 min. The PCR product was analyzed on 1.0% agarose gel along with Step UpTM 500bp DNA ladder.

PCR conditions:

94°C	94°C	55°C	72°C	72°C
5 min	30sec	30sec	2 min	10 min
35 cycles				

16 S rDNA sequencing and data analysis

Sequencing analysis was performed on 1500bp by PCR product. The PCR product was cloned into TA vector and sequenced using the T7 forward read, 13BG read (internal primer) and SP6 h (reverse primer). DNA sequences were determined using the dideoxynucleotide chain termination method which was performed on a highly automated gene sequencer (SciClone G3 sequencer) and were checked for the overlap to get the similarity and the whole sequence was then compiled with results obtained. This compiled sequence was uploaded in NCBI Basic Local Alignment Search Tool BLAST with nucleotide filtering option to get the 10 closest homologs. A distance matrix was generated using the Kimura-2-Parameters. CLUSTAL W program and multiple sequence alignment tools were used for phylogenetic analysis (Thompson *et al.*, 1997).

The phylogenetic tree was made using Neighbour Joining method (Saitou and Nei, 1987) with alphabet size 4 and length size 1000. The 16S rDNA nucleotide sequence of strain MG2 is deposited in (NCBI, US) Gene Bank Database and culture was deposited to MTCC, Chandigarh, India.

Optimization of growth conditions

The optimization of growth parameters was performed by methods described below. The inoculum required for all experiments was also standardized.

Preparation of inoculum

The culture of bacterial isolate MG2 namely *Staphylococcus argenteus* MG2 was inoculated in 50 ml of Tributyrin broth in 250 ml Erlenmeyer flask under aseptic condition and incubated on an orbital shaking incubator at 37°C for 24 h at 130 rpm. 1 ml (Approximately 4.8×10^8 cells/ml) of resulted broth was used as inoculum in 100 ml culture medium in all experiments (0.5 MacFarland Scale, Smibert, 1994).

Influence of pH on growth

100 ml of Tributyrin broth medium flasks with pH 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10 were inoculated with 1 ml inoculum of MG2 and incubated at 37°C for 24 h in static condition. The growth of the bacteria (Optical Density) was observed at 660 nm by spectrophotometer.

Influence of temperature on growth

100 ml of Tributyrin broth medium (pH 7) flasks were inoculated with 1 ml inoculum of MG2 and incubated at different temperature 22, 25, 30, 35, 37, 40, 42°C for 24 h in static condition. The growth of the bacteria (Optical Density) was observed at 660 nm by spectrophotometer.

Influence of various carbon sources on growth

To study the effect of different carbon sources on growth of isolate MG2, 100 ml each of Tributyrin broth medium (pH 7) with different carbon sources viz. 1 g% each of glucose, mannose, xylose, mannitol, fructose, lactose, sucrose, maltose, molasses were used. All the media were inoculated with 1 ml inoculum of bacterial isolate MG2 and incubated at 37°C for 24 h in static condition. The growth of the bacteria (Optical Density) was observed at 660 nm by spectrophotometer.

Influence of various nitrogen sources on growth

To study the effect of different nitrogen sources on growth of isolate MG2, 100 ml each of Tributyrin broth medium (pH-7) with different nitrogen sources viz. 1 g% each of organic nitrogen sources like peptone, yeast extract, beef extract, gelatin, casein, soy meal, corn steep liquor, tryptose were inoculated with 1 ml of inoculum of bacterial isolate and incubated at 37°C for 24 h in static condition. The growth of the bacteria (Optical Density) was observed at 660 nm by spectrophotometer.

Influence of various concentrations of salts (NaCl) on growth

100 ml of Tributyrin broth medium (pH-7) flasks containing different concentrations of sodium chloride i.e. 0.5, 1, 2, 5, 7.5, 10 g% were inoculated with 1 ml inoculum of MG2 and incubated at 37°C temperature for 24 h in static condition. The growth of the bacteria (Optical Density) was observed at 660 nm by spectrophotometer.

The strain MG2 was also optimized for lipase production and its lipase activity was determined on the basis of titrimetric assay (Golani *et al.*, 2016).

RESULTS**Screening of lipase producing bacteria**

Lipolytic bacterial isolates 75 in number were screened from diverse samples. Among these isolates, MG2 (pH-7) showed maximum zone of hydrolysis (2.57 mm) around colony (Fig. 1) (Table 1) and was also able to grow at pH-9 with maximum lipase activity (3.12 mm) which shows its alkali tolerant nature and was selected for further studies.

Characterization of selected bacterial isolate

The morphological, colonial, cultural and biochemical characteristics of isolate designated as MG2 are shown in Table 2. The isolate MG2 was found to be gram positive cocci and non-motile. The colonial characters of isolate MG2 were medium, round, even, regular, low convex, smooth, opaque, orange pigmented

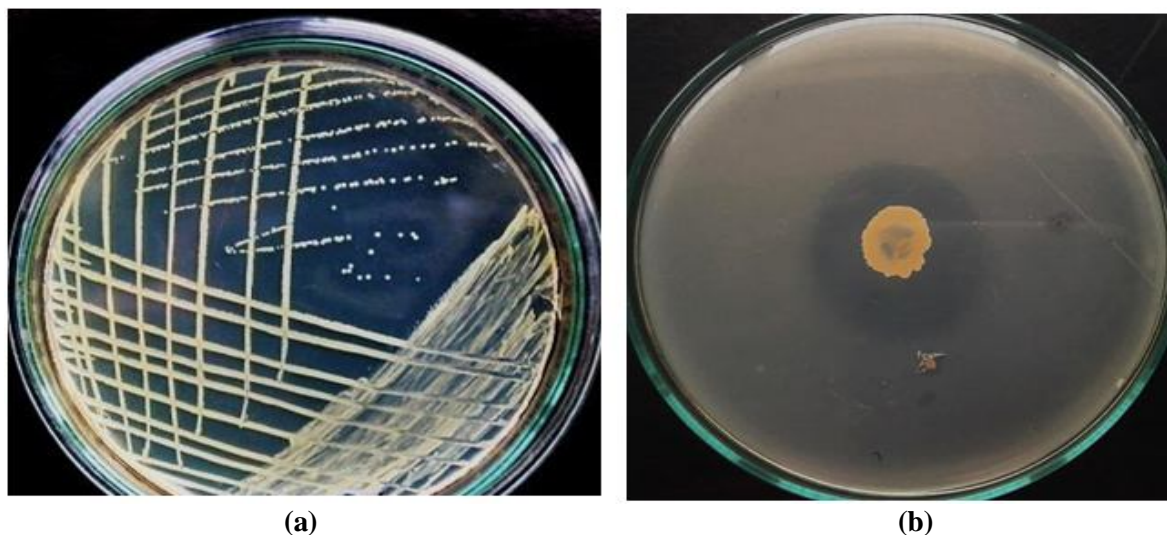


Fig-1: Zone of hydrolysis by lipase producing *Staphylococcus argenteus* MG2 on Tributyrin agar plate (a) isolated colonies (b) patch test

Table-1: Comparative analysis of lipase activity by isolates (pH - 7.0)

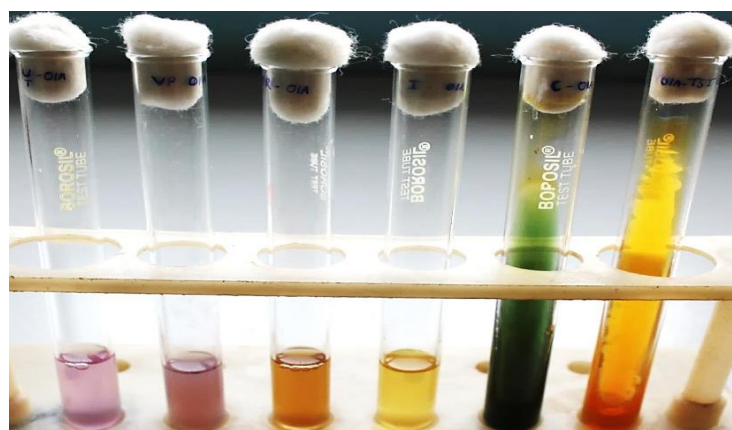
S. No.	Designation of isolates	Zone of lipid hydrolysis (mm)	Growth zone (mm)	Lipolytic activity
1	MG2	18	7	2.57 *
2	O7A	21	11	1.90
3	O8A	20	10	2.00
4	O13A	19	10	1.90
5	O1B	18	8	2.25
6	G4A	20	8	2.50
7	G5A	21	12	1.75
8	S3A	15	7	2.14
9	OC	15	8	1.87
10	C1	19	10	1.90
11	St1	18	10	1.80
12	St2	19	10	1.90

Table-2: Morphological, colonial and biochemical characteristics of isolate MG2

1.	Cell morphology	Gram positive cocci, 0.8-1µm, occur in pairs, tetrads or clusters;
2.	Colony morphology	Medium, round, even, regular, low convex, smooth, opaque, orange pigmented.
3.	Motility Hanging drop method	Non motile
4.	Staining - Gram staining - Capsule Staining	Gram Positive Negative
5.	Biochemical tests - Indole test - Methyl Red test - Voges Proskauer test - Citrate utilization - Urease test - Sugar fermentation test Dextrose Sucrose Lactose Maltose - H ₂ S Production - Gas production - Oxidase - Catalase -Haemolytic activity - Starch hydrolysis (Amylase) -Casein hydrolysis (Protease)	Negative Negative Negative Negative Negative Positive Positive Positive Positive Negative Negative Negative Positive Negative Negative Negative

Identification of selected isolate

The taxonomic status of the selected bacterium MG2 was identified following the criteria laid down by Bergey's Manual of Determinative Bacteriology (Holt *et al.*, 1994). The selected bacterium MG2 was negative towards citrate utilization, indole test, methyl red and voges- proskauer tests, H₂S production, urea hydrolysis, oxidase and hemolytic activity test (Fig. 2). The isolate MG2 was not able to produce amylase and protease enzyme. The strain was catalase positive (Table 2). The isolate was further identified up to species level and confirmed on the basis of 1500bp of 16S rDNA gene sequence analysis by Microbial Type Culture Collection Center, Chandigarh, India.

Fig-2 (a): Biochemical tests of *S. argenteus* MG2Fig-2 (b): Hemolytic activity test of *S. argenteus* MG2 (No hemolysis)

Molecular characterization and identification of the bacteria

The strain showing maximum zone of hydrolysis was designated as MG2. The Molecular characterization and identification of the isolate MG2 was done at IMTECH, Chandigarh lab. Using consensus primers, the ~ 1.5 kb 16S rDNA fragment was amplified using *Taq* DNA Polymerase by PCR technique (Fig. 3). The sequencing analysis was performed on a 1500bp (Fig. 4) PCR product. DNA sequences were determined using the dideoxynucleotide chain termination method and were checked for the overlap to get the similarity and then the whole sequence was compiled with results obtained. This compiled sequence was then uploaded in NCBI Basic Local Alignment Search Tool (BLAST) with nucleotide filtering option to get the 10 closest homologs. A distance matrix was generated using the Kimura-2-Parameters. CLUSTAL W program and multiple sequence alignment tools were used for phylogenetic analysis (Thompson *et al.*, 1997). The phylogenetic tree (Fig. 5) was made using Neighbor Joining method (Saitou and Nei, 1987) with alphabet size 4 and length size 1000.

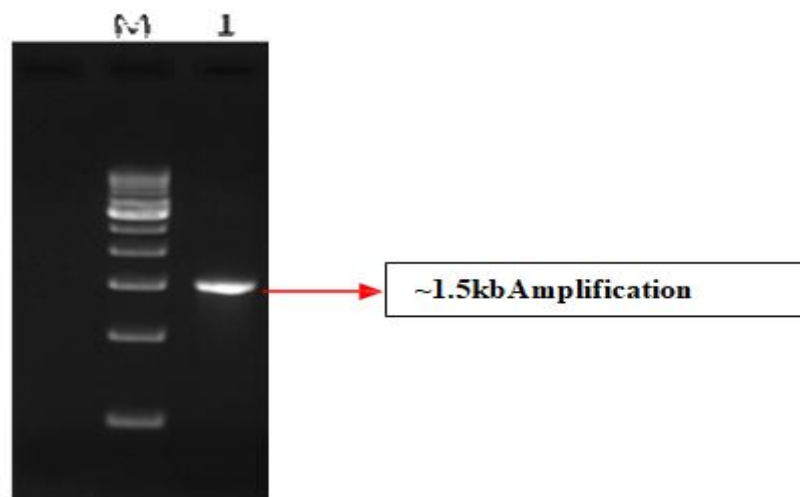


Fig-3: Lane descriptions of PCR

Lane 1: PCR Amplification of sample – *Staphylococcus argenteus* MG2**Lane M: StepUp™ 500bp DNA ladder (Cat# 612651970501730)**

GAGTTTGATCCTGGCTCAGGATGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAGCGAACGGACGA
 GAAGCTTGCTTCTCTGATGTTAGCGGCGGACGGGTGAGTAACACGTGGATAACCTACCTATAAGACTGG
 GATAACTTCGGGAAACCGGAGCTAATACCGGATAATATTTTGAACCGCATGGTTCAAAGTGAAGACGG
 TCTTGCTGTCACTTATAGATGGATCCGCGCTGCATTAGCTAGTTGGTAAGGTAACGGCTTACCAAGGCAA
 CGATGCATAGCCGACCTGAGAGGGTGATCGGCCACACTGGAAGTGAAGACACGGTCCAGACTCCTACGG
 GAGGCAGCAGTAGGGAATCTTCCGCAATGGGCGAAAGCCTGACGGAGCAACGCCGCGTGAGTGATGAA
 GGTCTTCGGATCGTAAAACTCTGTTATTAGGGAAGAACATATGTGTAAGTAACTGTGCACATCTTGACG
 GTACCTAATCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTA
 TCCGGAATTATTGGGCGTAAAGCGCGCGTAGGCGGTTTTTTAAGTCTGATGTGAAAGCCCACGGCTCAA
 CCGTGGAGGGTCATTGAAACTGGAAACTTGAGTGCTGAAGAGGAAAGTGGAATTCATGTGTAGCG
 GTGAAATGCGCAGAGATATGGAGGAACACCAAGTGGCGAAGGCGACTTTCTGGTCTGTAAGTACGCTG
 ATGTGCGAAAGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGAGTACT
 AAGTGTTAGGGGGTTTCCGCCCTTAGTGCTGCAGCTAACGCATTAAGCACTCCGCTGGGGAGTACGA
 CCGCAAGGTTGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGAGCATGTGGTTTAATTTCG
 AAGCAACGCGAAGAACCTTACCAAATCTTGACATCCTTTGACAACCTCTAGAAATAGAGCTTTCCCCTTC
 GGGGGACAAAGTGACAGGTGGTGATGTTGTCGTCAGCTCGTGTCTGAGATGTTGGGTTAAGTCCCG
 CAACGAGCGCAACCCTTAAGCTTAGTTGCCATCATTAAAGTTGGGCACTCTAAGTTGACTGCCGGTGACA
 AACCGGAGGAAGGTGGGGATGACGTCAAACATCATGCCCTTGTGATTTGGGCTACACACGTGCTACAA
 TGGACAATACAAAGGGCAGCGAAACCGCGAGGTCAAGCAAATCCCATAAAGTTGTTCTCAGTTCGGATT
 GTAGTCTGCAACTCGACTACATGAAGCTGGAATCGCTAGTAATCGTAGATCAGCATGCTACGGTGAATA
 CGTTCCCGGGTCTTGTACACACCGCCCGTCACACCAGAGAGTTTGTAAACCCGAAGCCGGTGGAGTA
 ACCTTTTAGGAGCTAGCCGTCGAAGGTGGGACAAATGATTGGGGTGAAGTCGT

Fig-4: Sequence data of 16S rDNA fragment of *Staphylococcus argenteus* MG2: (1500bp)

The physiological analysis of this strain using its 16S rDNA sequence shows that strain MG2 had highest homology (99.6%) with *Staphylococcus argenteus*. The morphological, cultural, physiological and biochemical characteristics as well as phylogenetic tree made using Neighbor Joining method (Saitou and Nei, 1987) suggested that the isolate MG2 was close to a novel bacterium *Staphylococcus argenteus*. Hence this strain was identified and named as *Staphylococcus argenteus* MG2 (MG2). The 16S rDNA nucleotide sequence of strain MG2 is deposited in (NCBI, US) Gene Bank Database under the accession number KY082046 and the culture identified as *Staphylococcus argenteus* MG2 has been deposited in Microbial Type Culture Collection Center and Gene Bank (MTCC), Institute of Microbial Technology (IMTECH), Chandigarh, India; under the accession number MTCC 12820.

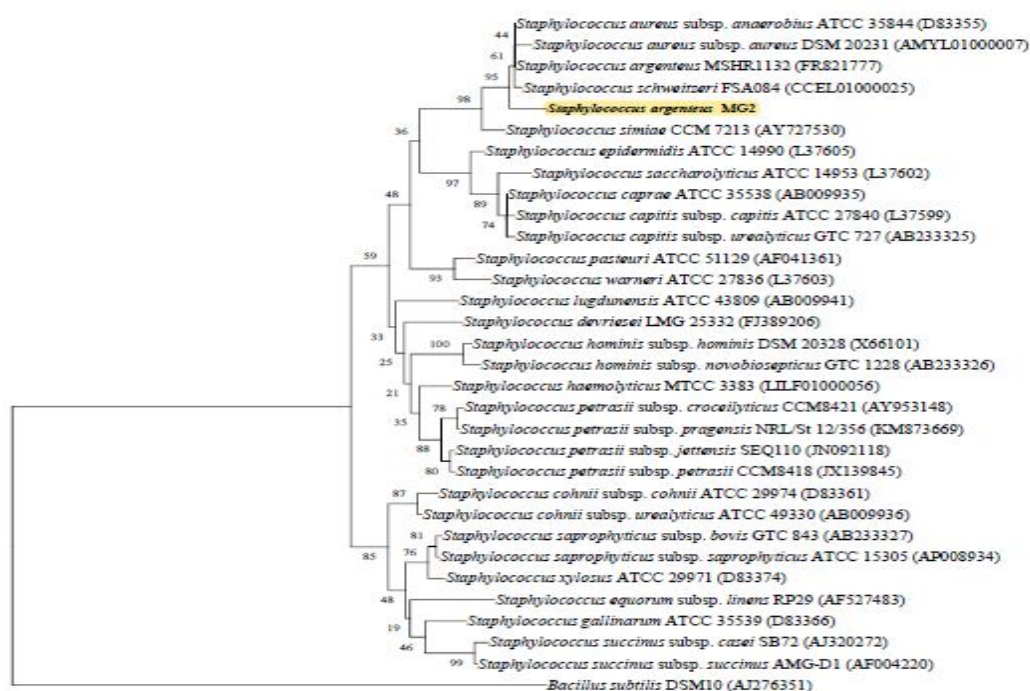


Fig-5: Phylogenetic Tree made using Neighbour Joining method

Optimization of growth conditions

The effect of various carbon sources, nitrogen sources, salt concentrations, pH and temperatures on growth of isolate MG2 was studied.

Preparation of inoculum

1 ml culture of *Staphylococcus argenteus* MG2 (Approximately 4.8×10^8 cells/ml) was used as inoculum in 100 ml culture medium in all experiments (0.5 McFarland Scale, Smibert, 1994).

Influence of pH on growth

The effect of pH on growth of isolate MG2 was studied in pH range 4-10. The growth of the isolate MG2 increased with increase in pH of the medium. The pH 7-8 was found to support growth of isolate MG2 maximally with a substantial decrease on both sides of it. The isolate MG2 was able to grow up to pH 9.5 which shows its alkali tolerant nature (Fig. 6).

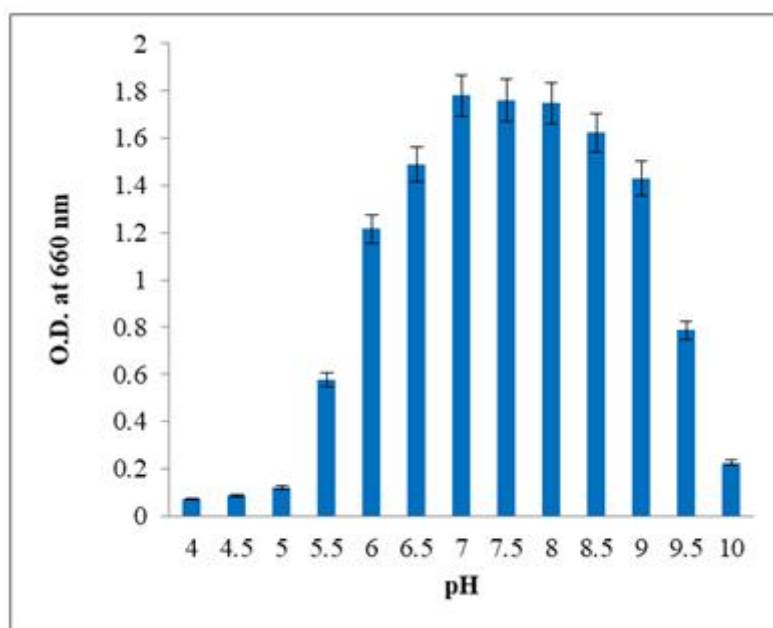


Fig-6: Effect of pH on growth

Influence of temperature on growth

The influence of temperature was determined at different temperature ranges i.e. 22-42°C (Fig. 7). For isolate MG2 growth was found to be in the temperature of 25 to 42°C. The optimum temperature for growth was found to be 37°C while at other temperatures growth was moderate to poor.

Influence of various carbon sources on growth

The effect of various carbon sources on growth of isolate MG2 was studied (Fig. 8). Most suitable carbon source for growth of isolate MG2 was lactose which was followed by molasses and mannose. Isolate MG2 gave moderate growth in presence of other sugars.

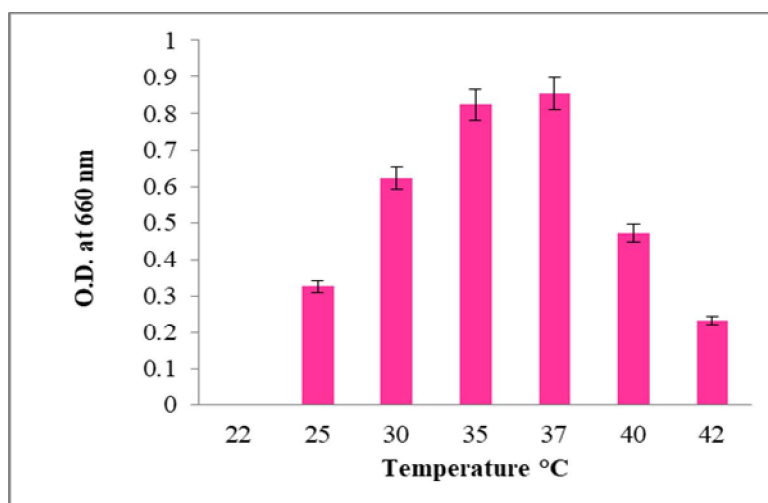


Fig-7: Effect of temperature on growth

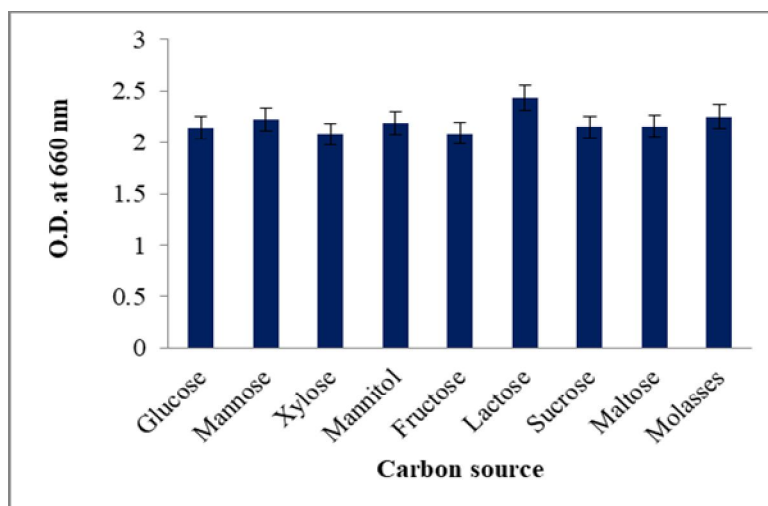


Fig-8: Effect of carbon sources on growth

Influence of various nitrogen sources on growth

The effect of various nitrogen sources on growth of isolate MG2 was determined (Fig. 9). Media optimization experiments revealed optimum nitrogen source as yeast extract which was followed by beef extract. In presence of tryptose and peptone, the growth of isolate MG2 was moderate while casein, gelatin, soymeal and corn steep liquor supported growth poorly. Growth was not obtained when inorganic nitrogen sources like ammonium sulphate, ammonium hydrogen phosphate, urea, and sodium nitrate were used (graph not shown).

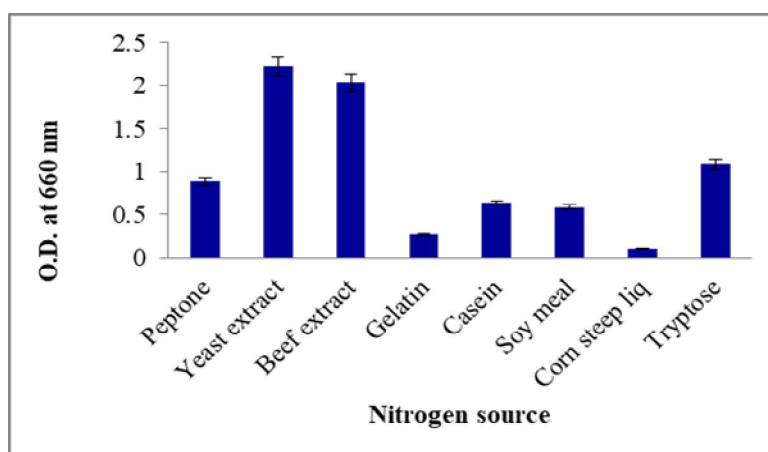


Fig-9: Effect of nitrogen sources on growth

Influence of various concentrations of salt (NaCl) on growth

The growth of isolate MG2 increased from 0.5-7.5% of NaCl and showed no growth in presence of 10% salt. Thus it was found that isolate MG2 attained maximum growth in presence of 7.5% salt and was able to tolerate up to 7.5% salt (Fig. 10).

On the basis of optimized parameters, the lipase activity of strain MG2 was found to be 18.18 $\mu\text{M}/\text{min}/\text{mg}$. The strain MG2 was earlier named as O1A (Golani *et al.*, 2016).

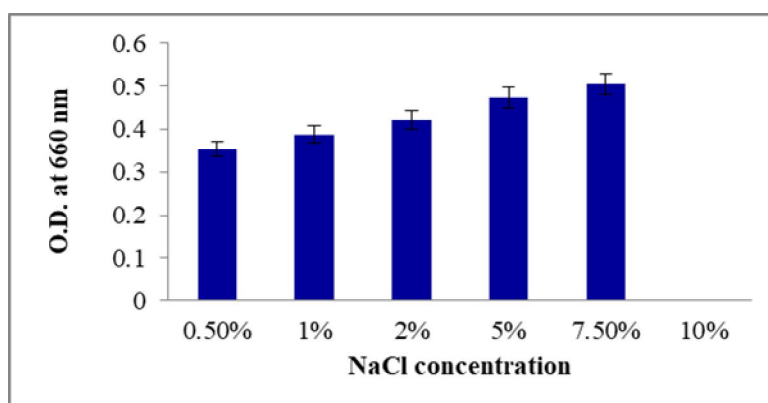


Fig-10: Effect of NaCl on growth

DISCUSSION

In our study a novel and potential lipase producing *Staphylococcus argenteus* MG2 bacterium was screened from oil spilled soil of Indore region. The isolate was identified up to species level and confirmed on the basis of 1500bp of 16S rDNA gene sequence analysis. *Staphylococcus argenteus* MG2 strain was found to be different from *Staphylococcus argenteus* identified by Tong *et al.*, 2015 because this is non lactose fermenting and non-pigment producing bacteria while strain MG2 is lactose fermenting and orange pigment producing bacteria.

Staphylococcus argenteus MG2 was isolated on Tributyrin agar medium plate because tributyrin is simplest triglycerides which can be degraded easily by lipase producing microorganisms.

Tong *et al.*, 2015 isolated *Staphylococcus argenteus* a novel bacterium and separated it recently from *Staphylococcus aureus*. This organism was also studied by Chantratia *et al.*, 2016 and reported it as white colony morphology consistent with the lack of staphyloxanthin. *Staphylococcus argenteus* is a newly identified *Staphylococcus* species and misidentified as *Staphylococcus aureus* (Hansen *et al.*, 2017). *Staphylococcus argenteus* has been reported to be more susceptible to oxidative stress and neutrophil killing in vitro and non-virulent (Tong *et al.*, 2013). Tong *et al.*, 2015, Chantratia *et al.*, 2016 and Hansen *et al.*, 2017 studied this *Staphylococcus argenteus* bacterium from clinical specimens.

Staphylococcus argenteus MG2, the isolate reported in this study, produces extracellular lipase in 48 h. The similar results of *Staphylococcus* sp. were obtained by Sirisha *et al.*, 2010; Pogaku *et al.*, 2010; Kumar *et al.*, 2012. Optimum growth was observed at 37°C temperature and pH 7.0 by *Staphylococcus argenteus* MG2. Similar results were reported for *staphylococcus* sp. (Horchani *et al.*, 20009; Sirisha *et al.*, 2010; Cherif *et al.*, 2011). Most of the bacterial species produce lipase between pH 6.5-7.0 (Dharmsthiti *et al.*, 1998; Gao *et al.*, 2004; Joseph *et al.*, 2006). *S. xylosus* was found to be active at a pH range of 6-10 (Khoramnia *et al.*, 2010). Our results were found to be similar for *Staphylococcus argenteus* MG2 which was also found to have optimum pH of 7.0. Yeast extract was found to be the best nitrogenous source for strain MG2 but the combination of yeast extract and peptone gave good results. Yeast extract and peptone were also used by Horchani *et al.*, 20009 and Cherif *et al.*, 2011.

CONCLUSION

The isolate MG2, characterized as novel and promising lipase producing *Staphylococcus argenteus* strain MG2 MTCC 12820, has shown a broad range of pH (6-10) and temperature (25-42°C). It was also found to show high salt tolerance which makes the organism to survive under extreme conditions.

SIGNIFICANCE OF THE STUDY

In our study a potential lipase producing *Staphylococcus argenteus* strain MG2 bacterium was isolated which can be used for the bioremediation of oil contaminated soil and water. It can also be used in detergent formulation due to alkali tolerant nature of bacteria.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

ETHICAL APPROVAL

This research article does not contain any studies with animals or human participants by any of the authors.

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SOCIAL INSURANCE: A CHOICE TO COVER UNCERTAINTY**Jayanthi P, Nidhi Dinesh K and Haresh R**

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ABSTRACT

Insurance is a tool to mitigate the losses and risks faced by people in their daily life. The Prime Minister has introduced various schemes like the PMJJY, PMJDY, APY and Pradhan Mantri Fasal Bima Yojana. They have focused on the low income groups, underprivileged and the lower sections of the society. There are the public sector insurance companies who have satisfied the rural and social sector responsibilities. Insurance regulatory development authority has set up few regulations that the companies should abide by and adhere to the obligations set up by them. The paper studies about the various schemes and the percentile of companies fulfilling the rural and social sector obligations. Insurance industry in India consists of 57 companies. The yojanas cover life insurance, crop insurance accidents and pension.

Keywords: Financial inclusion, premium, social security, IRDA, rural & social sector.

INTRODUCTION

Insurance is a tool which is used to manage the risks, the main objective of insurance is to protect people from uncertainties. The insurance industry of India consists of 57 insurance company, 24 are life insurance and 33 are non-life insurers. India is a big motherland with enormous population where the majority of the population belongs to low income group, which shows that the country's economic growth is not being progressed. So in 2005 shri Y.V.Reddy presented financial inclusion which helps the low income groups and weaker section people to get all the facilities by the financial services at an affordable price. The country's fiscal growth and improvement can happen with the support of financial enclosure without the fiscal inclusion the country cannot achieve its economic growth. The financial inclusion has a high priority in India, which gave rise to many social sector schemes which helps the country to develop economically. Government of India took an initiative and contributed number of social security schemes through financial inclusion to provide financial security for the low income group and weaker section of the society. The GOI has introduced many schemes for the economically vulnerable group but these people are not even aware of the schemes and its benefits. So NDA government came up with the social welfare scheme that is PMJDY India's National Operation for Monetary Inclusion which was inaugurated by Prime Minister Narendra Modi on 28/08/2014, it focus to have at least one bank account for every household (Kumar, march 2015). Pradhan Mantri launched many yojanas like PMJJY which is life insurance. APY is basically Pension scheme, and PMSBY which covers unplanned death or infirmity insurance, Pradhan Mantri Mudra Yojana and mudra bank on 8th April 2015 with the slogan "punji-Safalata Ki Kunji", the core impartial of this scheme is to offer credit facility to small businesses where the credit limit is up to Rs.10lakh (Dr.Anurodh Godha, March 2017). IRDA plays a dynamic role in regulating the insurance business.

OBJECTIVES OF THE STUDY

- (1). To know the obligations of insurance industry towards rural and social sector
- (2). To study on various social sector schemes (for life, non-life, health insurance)
- (3). To analyze whether they have fulfilled social sector obligations according to IRDA

(1). RURAL AND SOCIAL SECTOR OBLIGATIONS

The Insurance regulatory and development authority of India (2015) has set some rural and social sector regulations. They were applicable from the financial year 2016-2017. The rural sector refers to the area which has a population of 15000, according to the Planning Commission. The social sector refers to the unorganized sector, the informal sector economically vulnerable and backward sector both in the rural area and the urban area.

OBLIGATIONS**Rural Sector****(a) In respect to the life insurers to the total number of policies**

Financial year from inception % of no. of policies

Sl. No	Financial year from inception	% f no. of policies
1)	First year	7%
2)	Second year	9%

3)	Third year	12%
4)	Forth year	14%
5)	Fifth year	16%
6)	Sixth and seventh year	18%
7)	Eighth and ninth year	19%
8)	Tenth and eleventh year and there after	20%

(b) In respect to General insurance, the % of gross premium income:

Sl. no	Financial year from inception	% of gross premium written
1)	First year	2%
2)	Second year	3%
3)	Third to seventh year	5%
4)	Eighth year	6%
5)	Ninth year and every year after	7%

(c). In respect of Standalone Health Insurers

For this the 50% of the obligations prescribed for the general insurers

SOCIAL SECTOR

In social sector it covers life, non-life and standalone health insurers

Age of the insurers in years	Percentage of social sector lives computed on the total business in the preceding financial year
1)	0.5%
2)	1%
3)	1.5%
4)	2%
5)	2.5%
6)	3%
7)	3.5%
8)	4%
9)	4.5%
10 and above	5%

In context to Regulations 3 insurers refer to the lives that are insured newly in that financial year and should have been already in force during the previous financial year.

Re-insurance premium is not inclusive while calculating the social -rural sector obligations. The business which covers the government subsidized social security schemes, the total premium is paid by the government itself will not be included in the social-rural sector obligations. This obligation was effective only from the last financial year (2017-2018). Basically in this schemes that are undertaken by the business, the beneficiaries do not give any kind of contribution.

(2). SOCIAL SECTOR SCHEMES (GOVERNMENT SCHEMES)

Pradhan Mantri Jeevan Jyoti Bima Yojana

It was first launched on 9th May, 2015 by the Prime Minister Sri Narendra Modi. This was started to cover the people who are as poverty-stricken who are unable to meet their needs. It covers the people of the age from 18-50 (it also has a life cover upto 55 years). It covers risk to people from 1st June 2015.

This scheme is directed through LIC and many other life insurance companies that are offering this product. These companies will also have link ups with the various banks who are willing to offers these schemes and they can freely give them to their respective customers or subscribers.

Scope of the coverage	Age group from 18-50 years, Aadhar card is the mean to fulfil the KYC norm
Benefits	Two lakhs is paid for the death of an individual due to any cause
Premium	Rs 330 per annum, it can be revised every year

PRADHAN MANTHRI SURAKSHA BIMA YOJANA

It is a scheme that offers accidental insurance for disability and death of a person due to an accident. This is offered by the Public sector general insurance companies and also by the other General insurance companies. They can also have tie ups with banks, who will in turn offer it to their subscribers.

Scope of the coverage	The age group from 18- 70 are eligible for this insurance cover
Premium	Rs 12 per annum per member

BENEFITS

	Table of benefits	Sum insured
a	Death	2 lakhs
b	Total and irrecoverable loss of both eyes or loss of both hands or feet or loss of one eye or loss of use of hand or feet	2 lakhs
c	Total and irrecoverable loss of sight of one eye and loss of use of one hand and feet	1 lakh

PRADHAN MANTHRI FASAL BIMA YOJANA

The main aim to introduce this scheme was to insure the crops which is the main source of income that was destroyed in the natural calamity, due to some pests or disease that is wide spread amongst the crop. This scheme is implemented through a multi -agency framework which is selected by the insurance companies under the guidance and the control of the Department of Agriculture, Cooperation & Farmers Welfare, Ministry of agriculture and Farmers welfare, Government of India and the state government with other agencies like as in financial institutions like the commercial banks, cooperative banks regional rural banks and their regulatory bodies. The scheme is implemented on an area approach basis which means notified area for the crop, which is the unit of insurance.

The farmers who have notified crops in a notified area and who have insurable interest are eligible for this scheme. This coverage can be divided into compulsory and voluntary. Compulsory coverage includes the farmers who have a crop loan account and the voluntary coverage includes any farmer who does not have the crop loan account.

The sum insured for the compulsory coverage category should be equal to the Scale of Finance that has been fixed by the District level technical committee. The sum insured for the voluntary coverage is upto the threshold value or the gate price of the insured crop.

PREMIUM RATES

Sl. No	Season	Crops	Maximum insurance charges payable by farmer (% of sum insured)
1	Kharif	Food and oil seeds crops (all cereals, millets and oil seeds, pulses)	2.0% of sum insured or Actuarial rate, whichever is less
2	Rabi	Food and oil seeds crops (all cereals, millets and oil seeds, pulses)	1.5% of sum insured or Actuarial rate, whichever is less
3	Kharif and Rabi	Annual commercial and horticulture crops	5% of sum insured or actuarial rate, whichever is less.

ATAL PENSION YOJANA

This was introduced in the 2015-2016 budget, this will provide pension for all the people in the unorganized sector will give a well-defined pension depending on the contribution and the time period. The citizens who have joined the National Pension System which is administered by the Pension Fund regulatory and Development authority. The subscribers will receive a fixed minimum pension of Rs 1000, 2000, 3000, 4000, 5000 per month depending on the contribution. The minimum age to join is 18 years and the maximum age 40 years. The minimum period of contribution will 20 years or it can exceed as well.

The government will also contribute 50% of the contribution or 1000 from 2015-2016 to 2019- 2020. After this tenure the government will not contribute.

(3).ANALYZING WHETHER THE INSURANCE COMPANIES HAVE FULFILLED THE SOCIAL SECTOR OBLIGATIONS ACCORDING TO IRDA**Only for 2016-17**

Particulars	Total gross premium underwritten Rs.	Rural sector premium	% of rural sector	No of lives covered	No of policies
United India insurance company	16062.67	2679.95	6%	105402765	-
Oriental insurance company	10803.34	1542.61	7%	1.93	2267161
National insurance company	14237.54	1565.67	10.99%	120807601	2854383
New India assurance company ltd	346268.67	292535.2	11.83%	-	5345306
SBI life insurance company					
Rural	104,99,444				308985
Social	567,73,000	-	11.93%	-	589,932

Only for 2017-18

Particulars	Total gross premium underwritten Rs.	Rural sector premium	% of rural sector	No of lives covered	No of policies
United India insurance company	17429.95	2900.1	6%	12,52,87,424	-
Oriental insurance company	4359749	204956.3	21%	-	3497326
National insurance company	16193.55cr	1565.67	12.90%	3361035	-
New India assurance company ltd	605963.3	418024.1	14.4%	-	6435286
SBI life insurance company					
Rural					338242
Social	13,091,861	-	10.90%	-	643,599

SIGNIFICANCE / NEED FOR THE STUDY

To analyze whether these schemes have fulfilled the social sector obligations according to IRDA and to know the awareness of people regarding these insurance schemes and its benefits.

RESEARCH METHODOLOGY**Data Collection Method**

Looking into requirement of the objectives the proposed research is based on secondary data which was collected through journals, articles, research papers and reports available at official websites.

CONCLUSION

Human life is uncertain and unpredictable where mishaps can occur at any time. So the government has taken up measures to reduce the risks and losses, especially to the rural and social sectors. The prime minister launched various schemes such as PMJJBY which is a life insurance scheme which offers life insurance coverage for death due to any reason with a low cost premium and must be renewed every year, PMSY is the scheme which covers accidental death with the premium just Rupees 12 per member per year, APY is a Pension scheme which provides old age income security to those working in unorganized sector by encouraging them to voluntarily save for their retirement, who do not have any formal pension provision (Charan singh, December 2015), PMJDY, PMFBY and various others as well. The Insurance Regulatory Development Authority of India has set up few obligations that has to be followed by the insurance companies. We have looked into the official websites of the five public sector companies and they have fulfilled the obligations. The government should take more initiatives to spread awareness of the importance of being insured. The insurance companies as well should come up with schemes that will help the rural and social sectors to emphasize on financial inclusion.

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A NEW APPROACH OF SOLAR POWERED ELECTRONIC VOTING MACHINE WITH AUTHENTICATION SYSTEM AND FOR BLIND PEOPLE

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ABSTRACT

In this paper, a new approach of renewable powered Electronic Voting Machine (EVM) is proposed and generally it is used for voting purpose. But in some foreign countries, E-Voting Systems have gained very much success by reducing the use of ballots and by using internet. The main reason why E-voting systems have gained such success in these countries is just because of convenience in this voting system as comparison to other traditional voting system. It reduces our time and cost also. We also discuss about some next generation hi-tech e-voting systems which can be used to improve traditional voting systems. In this system, thumb impression for voter identification or authentication has been used. Every person has an individual unique thumb impression and it helps with accuracy. In a constituency the thumb impression of the database is created for all the voters through this the illegal and repetition of votes is checked. And also aid for Blind people using Mini Embedded MP3 Sound Module while vote, the people can hear the name of the political parties and the SMS method used to send your vote to the voters the GSM method.

Keywords: Electronic Voting Machine (EVM), Solar power, E-voting, Authentication system

I. INTRODUCTION

Power crisis is one of the major problems plaguing in India. Being a power starved nation, it cannot yet guarantee reliable supply of electricity in its metropolitan cities. It cannot further provide electricity facilities to rural, remote areas. This naturally rules out designing devices like EVMs for sensitive tasks like vote collection entirely or primarily dependent on grid power. This calls in for the need of such device that is electronic yet does not need to rely entirely on the grid network as its power source. It may be mentioned here that the power system in India, i.e. power generation, is entirely dependent on fossil fuel based power generation. Fossil fuel reserves are being depleted world-wide and at an even faster rate in this country.

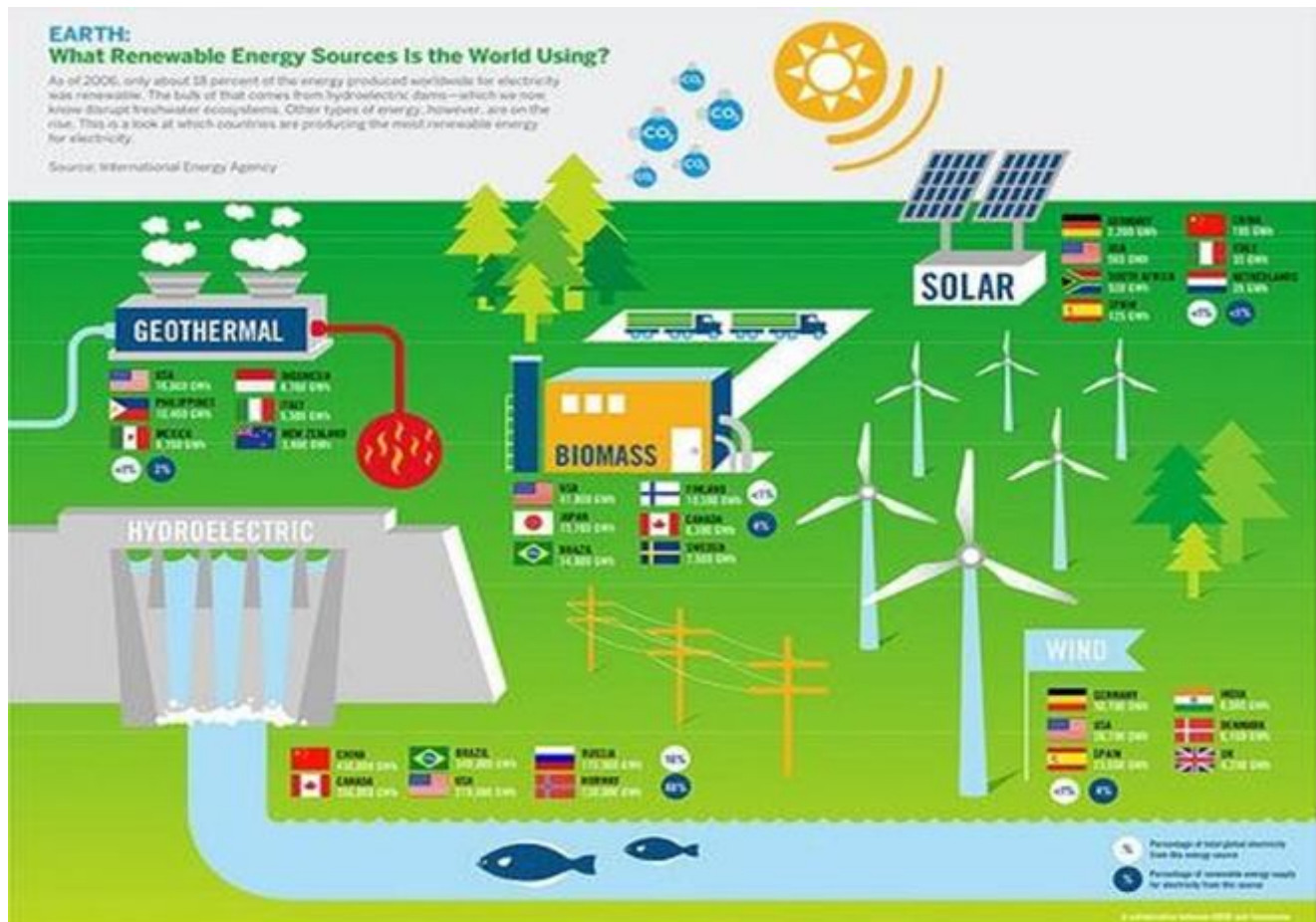


Fig-1.1: Renewable resource

The country's government is now actively vying for sustainable alternatives, namely renewable energy sources. The figure (1.1) shows the Renewable resources are natural resources which can be replenished with the passage of time either through biological reproduction of other naturally occurring processes. About 16% of the global final energy consumption comes from renewable resources. The share of renewable in electricity generation is around 19% with 16% of electricity coming from hydroelectricity and 3% from new renewable (wind, solar, geothermal, biofuel and modern biomass).

HYBRID RENEWABLE ENERGY (SOLAR & WIND)

According to many renewable energy experts, a small "hybrid" electric system that combines home wind electric and home solar electric (photovoltaic or PV) technologies offers several advantages over either single system.

In much of the United States, wind speeds are low in the summer when the sun shines brightest and longest. The wind is strong in the winter when less sunlight is available. Because the peak operating times for wind and solar systems occur at different times of the day and year, hybrid systems are more likely to produce power when you need it.

Many hybrid systems are stand-alone systems, which operate "off-grid" -- not connected to an electricity distribution system. For the times when neither the wind nor the solar system are producing, most hybrid systems provide power through batteries and/or an engine generator powered by conventional fuels, such as diesel. If the batteries run low, the engine generator can provide power and recharge the batteries.

Adding an engine generator makes the system more complex, but modern electronic controllers can operate these systems automatically. An engine generator can also reduce the size of the other components needed for the system. Keep in mind that the storage capacity must be large enough to supply electrical needs during non-charging periods. Battery banks are typically sized to supply the electric load for one to three days.

IMPORTANCE OF SOLAR ENERGY

Among all the renewable resources, solar is the most preferable as it is easily available in nature. In recent time the equipment associated with are accessible at a reasonable cost. However, solar is a dilute source of energy.

Compared to the overall power intercepted by Earth, power received per unit area is small maximum value is about 1000 W/m². Hence to acquire the required quantity of power a large collector area is required. Solar powered electricity generation uses either photovoltaic or heat engines, concentrated solar power (CSP). CSPs use lenses or mirrors and tracking systems to focus a large area of sunlight into a beam. Photovoltaic convert light into electric current using photovoltaic effect. Renewable energy is a viable means of generating energy in Asia. For solar power, South Asia has the ideal combination of both high solar isolation and a high density of potential customers.

VOTING MACHINE IN INDIA

Electronic Voting Machine ("EVM") shows the figure (1.2) are being used in Indian General and State Elections to implement electronic voting in part from 1999 elections and recently in 2017 state elections held in five states across India. EVMs have replaced paper ballots in local, state and general (parliamentary) elections in India. There were earlier claims regarding EVMs' tamperability and security which have not been proved.



Fig-1.2: Voting Machine

After rulings of Delhi High Court, Supreme Court and demands from various political parties, Election Commission decided to introduce EVMs with voter-verified paper audit trail (VVPAT) system. The VVPAT system was introduced in 8 of 543 parliamentary constituencies as a pilot project in Indian general election.

II. PROPOSED METHODOLOGY

Initially the solar panels is charged with the help of sun and the energy in the form of voltages is stored in the 12v battery. Then output of the panel used in the input for the electronic voting machine. As in India, only few states having EVM powered in renewable energy, this innovative concept helps to harness the energy and producing uninterruptable power to EVM. Through voice recognition process, the people visionly challenged can vote. The GSM module acts to describe the protocols between the networks and the devices (EVM). Finger print sensor provides an access to operate the machine. This helps to enhance user identity and prevents for theft information's.

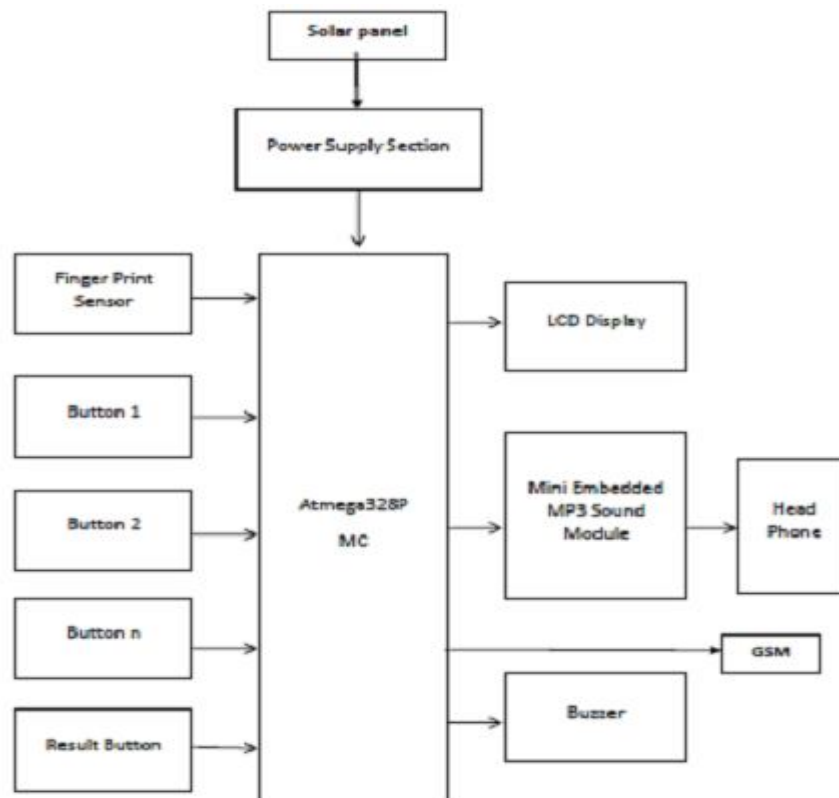


Fig-2.1: Block diagram

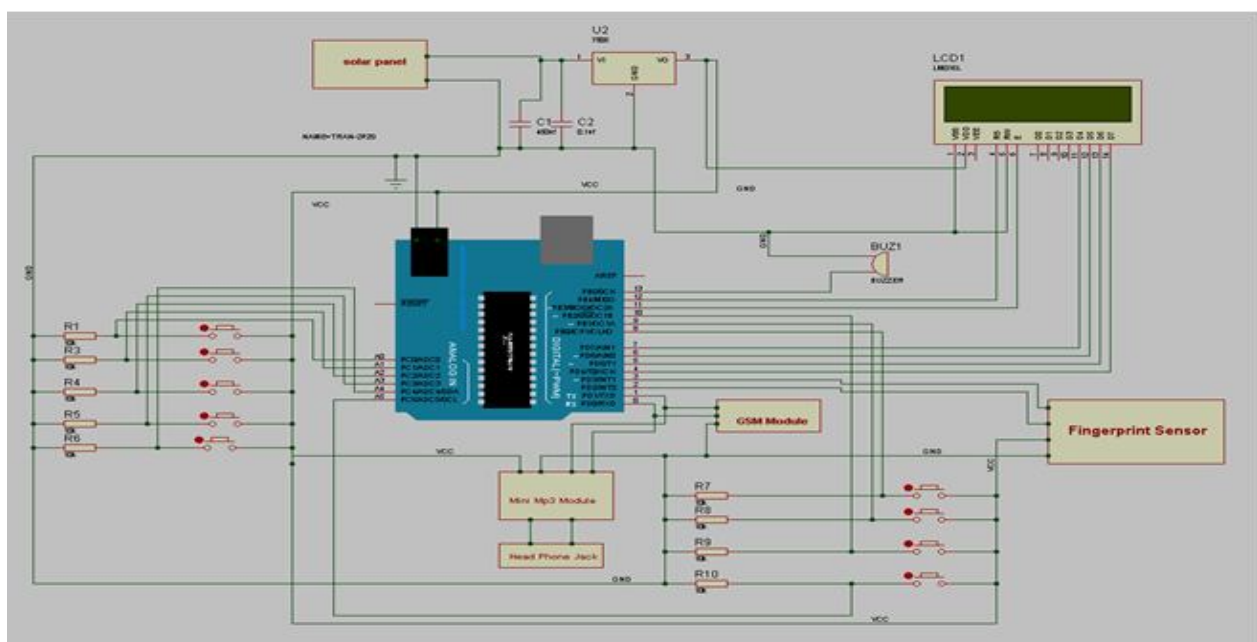


Fig-2.2: Circuit diagram for Solar powered electronic voting machine with authentication system

III. PROTOTYPE SNAPS & DISCUSSIONS



Fig 3.1 Disassemble of components



ig 3.2 EV Machine with solar panel

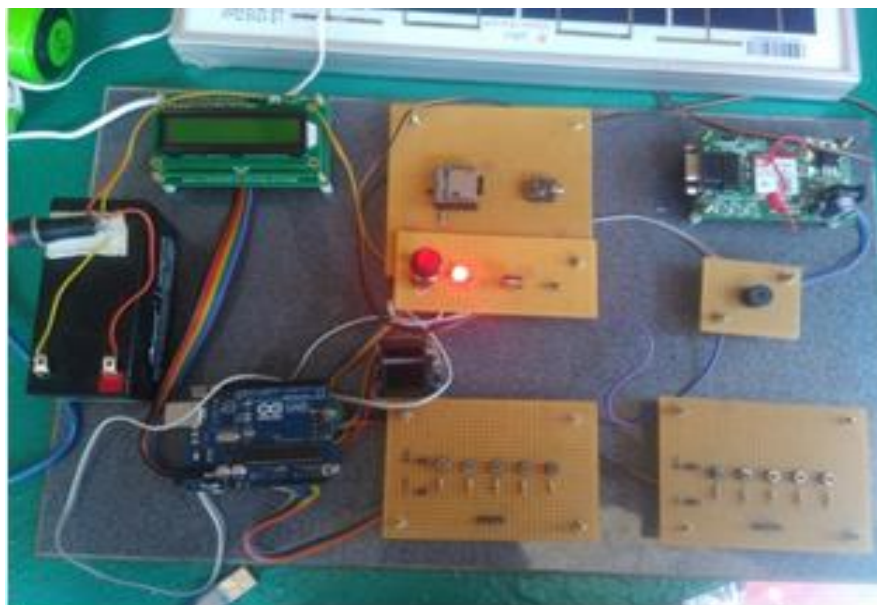


Fig-3.3: Overview of Electronic voting machine

DISCUSSIONS

The constant name and the soured votes will be displayed on the LCD, when the controller receives results instruction through the switches. The EVM have two buttons are given to see the result in end of the process one for the blind the other for ordinary humans. The blind button will only work when the blind human finger print are placed. The ordinary button will only work when the ordinary human finger print are placed.

CONCLUSION

As the elections like government needs these type of secured system's which is generally used for the public and visionly challenged people. The use of components for this particular devices are very less and operated for a long tenure. The finger impression and authenticated security helps to enhance the device from protecting it from unauthorized persons. The most economic and reduced electricity tariffs is the one which we implemented in this project was introduction of renewable energy (i.e.) solar. This gives the independent extraction of power flow the grid and also eco-friendly. Thus the solar operated EVM with authenticated system for visionly challenged people helps for the environment as well as to the society.

ACKNOWLEDGEMENT

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A STUDY ON CAUSES AND LEVEL OF STRESS AMONG PARENTS OF HIGHER SECONDARY SCHOOL STUDENTS IN TAMIL NADU

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ABSTRACT

Higher secondary school education is highly important and turning point for students in their academic life. Parents of higher secondary school students are highly worrying about academic performance, health, discipline and future of their children. Significant difference is prevailing among causes of stress and profile of parents of higher secondary school students. More than two fifth of them have moderate level of stress. Significant association is prevailing among stress level and profile of parents of higher secondary school students apart from monthly income and type of family. Causes of stress for parents of higher secondary school students have significant, positive and high relation with their level of stress. In order to manage or reduce stress among parents of higher secondary school students, they should spend sufficient time with their children and they must discuss, identify and understand their problems and appropriate and corrective measures should be taken in order to make them to concentrate on their studies and healthy. Parents of higher secondary school students should motivate their children for best performance in public examination and make them to realize the importance of getting good marks, course and admission in the best college for their bright future.

Keywords: Causes, Higher Secondary Students, Parents, Stress

1. INTRODUCTION

Stress is a condition of persons which arises from their interface with environment that is highly demanding and danger to their well beings (Sindhu, 2016). Stress is the non specific reaction or response of human body to demands created on it or to upsetting occurrences in the environment (Bartwal et al 2013). It is a practice by which human beings recognize and manage with environmental menaces and problems (Suresh, 2015) and environmental, personal and family actions cause stress (Kumar et al 2011). Stress is an emotional disturbances or alterations caused by various stressors. Stress that encourages and assists learning is stated as good stress and stress at optimal level improves abilities for learning (Kaplan et al 2005), while, stress that restraints learning is described as bad stress and it has to be evaded.

Higher secondary school education is highly important and turning point for students in their academic life, but at the same time, they are experiencing various problems and they have greater chances to divert their attention and concentration to other things (Ghatol, 2017). Besides, parents of higher secondary school students are highly worrying about academic performance, health, discipline and habits of their children. Further, parents are very anxious to get good course and admission in the best college for their children because that decides their future life and these create stress among parents of higher secondary school students. Thus, it is essential to study causes and level of stress among parents of higher secondary school students in Tamil Nadu.

2. METHODOLOGY

The present study is done in Tamil Nadu and parents of higher secondary school students are selected by using simple random sampling method. The questionnaire method is used to collect data from 300 parents of higher secondary school students. Percentages are calculated to know profile of parents of higher secondary school students and their stress level and mean and standard deviation are worked out to examine causes of stress among parents of higher secondary school students. t-test and F-test are done to scrutinize difference among profile of parents of higher secondary school students and causes of stress. Chi-square test is used to study association among profile of parents of higher secondary school students and stress level. Correlation analysis is carried out to study relation among causes of stress and stress level of parents of higher secondary school students.

3. RESULTS

3.1. Profile of Parents of Higher Secondary School Students

The profile of parents of higher secondary school students is given in Table-1. The findings explicate that 57.67 per cent of parents of higher secondary school students are males, whilst, 42.33 per cent of them are females and 43.33 per cent of them are falling under age category of 46 – 50 years, whilst 26.00 per cent of them are falling under age category of 41 – 45 years. The findings disclose that 40.67 per cent of them are possessing college education, whilst 22.33 per cent of them are possessing informal education and 55.67 per cent of them are working in private sector, whilst 44.33 per cent of them are working in Government sector. The findings

clarify that 34.33 per cent of them are earning monthly income of Rs.35,001 – Rs.45,000, whilst, 13.33 per cent of them are earning monthly income of above Rs.45,000 and 64.33 per cent of them are belonging to nuclear family, whilst, 35.67 per cent of them are belonging to joint family.

Table-1: Profile of Parents of Higher Secondary School Students

Profile	Number of Parents	Percentage
Gender		
Male	173	57.67
Female	127	42.33
Age Category		
41 – 45 Years	78	26.00
46 – 50 Years	130	43.33
51 – 55 Years	92	30.67
Education		
Informal	67	22.33
School	111	37.00
College	122	40.67
Occupation		
Government Sector	133	44.33
Private Sector	167	55.67
Monthly Income		
Below Rs.25,000	62	20.67
Rs.25,001 – Rs.35,000	95	31.67
Rs.35,001 – Rs.45,000	103	34.33
Above Rs.45,000	40	13.33
Type of Family		
Joint	107	35.67
Nuclear	193	64.33

3.2. Causes of Stress Among Parents of Higher Secondary School Students

The causes of stress among parents of higher secondary school students were examined and the results are given in Table-2.

Table-2: Causes of Stress among Parents of Higher Secondary School Students

Causes of Stress	Mean	Standard Deviation
Lack of concentration of their children on studies	3.95	0.92
Inadequate motivation for their children by teachers	3.39	1.05
Health problems of their children	3.92	0.98
Poor performance of their children in class tests	3.97	0.94
Lack of effective tuition facilities for their children	3.36	1.06
Anxiety for scoring very good marks by their children in public examination	3.90	0.93
Worry for getting good course for their children	3.94	0.91
Concern for getting admission in the best college for their children	3.98	0.90

The parents of higher secondary school students are agreed with lack of concentration of their children on studies, health problems of their children, poor performance of their children in class tests, anxiety for scoring very good marks by their children in public examination, worry for getting good course for their children and concern for getting admission in the best college for their children, while, they are neutral with inadequate motivation for their children by teachers and lack of effective tuition facilities for their children.

3.3. Profile of Parents of Higher Secondary School Students and Causes of Stress

To scrutinize difference among profile of parents of higher secondary school students and causes of stress, t-test and ANOVA (Analysis of Variance) test are done and the results are given in Table-3.

Table-3: Difference among Profile of Parents of Higher Secondary School Students and Causes of Stress

Particulars	t-Value / F-Value	Sig.
Gender and Causes of Stress	5.140** (t-value)	.000
Age Category and Causes of Stress	4.784** (F-value)	.000
Education and Causes of Stress	4.523** (F-value)	.000
Occupation and Causes of Stress	4.646** (t-value)	.000
Monthly Income and Causes of Stress	4.788** (F-value)	.000
Type of Family and Causes of Stress	5.715** (t-value)	.000

** Significant at 1 % level

The t-values and F-values are demonstrating significant difference exists in causes of stress among profile of parents of higher secondary school students at one cent level. As a result, the null hypothesis is not accepted.

3.4. Stress Level of Parents of Higher Secondary School Students

The stress level of parents of higher secondary school students is given in Table-4.

Table-4: Stress Level of Parents of Higher Secondary School Students

Stress Level	Number of Parents	Percentage
Low	70	23.33
Moderate	126	42.00
High	104	34.67
Total	300	100.00

Among 300 parents of higher secondary school students, 42.00 per of them are having moderate level of stress following by high level (34.67 per cent) and low level (23.33 per cent).

3.5. Profile of Parents of Higher Secondary School Students and Stress Level

To study association among profile of parents of higher secondary school students and stress level, Chi-square test is used and the results are given in Table-5.

Table-5: Association among Profile of Parents of Higher Secondary School Students and Stress Level

Particulars	Chi-square Value	Sig.
Gender and Stress Level	10.931**	.004
Age Category and Stress Level	10.938*	.027
Education and Stress Level	16.515**	.002
Occupation and Stress Level	14.105**	.001
Monthly Income and Stress Level	10.456	.107
Type of Family and Stress Level	0.566	.754

** Significant at 1 % level & * Significant at 5 % level

The Chi-square values are elucidating significant association exists among stress level and profile of parents of higher secondary school students excluding monthly income and type of family. As a result, the null hypothesis is not accepted.

3.6. Relation among Causes of Stress and Stress Level of Parents of Higher Secondary School Students

The relation among causes of stress and stress level of parents of higher secondary school students was studied through correlation analysis and the results are given in Table-6.

Table-6: Relation among Causes of Stress and Stress Level of Parents of Higher Secondary School Students

Particulars	Correlation Co-efficient
Causes of Stress and Stress Level of Parents of Higher Secondary School Students	0.72**

** Significant at one per cent level

The correlation coefficient among causes of stress and stress level of parents of higher secondary school students is 0.72, it reveals that both are positively and highly related at one per cent level of significance. As a result, the null hypothesis is not accepted.

4. CONCLUSION

The above findings make clear that significant difference is prevailing among causes of stress and profile of parents of higher secondary school students. More than two fifth of them have moderate level of stress. Significant association is prevailing among stress level and profile of parents of higher secondary school students apart from monthly income and type of family. Causes of stress for parents of higher secondary school students have significant, positive and high relation with their level of stress. In order to manage or reduce stress among parents of higher secondary school students, they should spend sufficient time with their children and they must discuss, identify and understand their problems and appropriate and corrective measures should be taken in order to make them to concentrate on their studies and healthy. Parents of higher secondary school students should motivate their children for best performance in public examination and make them to realize the importance of getting good marks, course and admission in the best college for their bright future.

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DELINEATION OF GROUND WATER POTENTIAL ZONES IN HARABHANGA BLOCK OF BOUDH DISTRICT, ODISHA: A REMOTE SENSING AND GIS APPROACH

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ABSTRACT

Groundwater has several advantages such as consistent temperature, widespread availability, decentralized access, limited vulnerability, outstanding natural quality, low extraction cost, and drought protection capacity. Another quality of groundwater in comparison to surface water is that it is least affected by disastrous events, and it can be tapped when required. As a result, exploitation of groundwater as an alternative to insufficiency and irregularity of surface water is ever increasing. So in many area groundwater extraction is exceeding annual recharge resulting in lowering of the groundwater table (GOI 2007). Remote Sensing data and the geographical information system (GIS) for the study of groundwater resources has grown into an advance technique in the field of groundwater research. In the present research, several groundwater potential zones for the calculation of groundwater accessibility in the Harbhanga block have been explained using Remote Sensing and GIS advanced techniques. Survey of India toposheets 1:50,000 and LISS-III satellite, which resolution is 30 meters imageries are used to prepare several thematic layers viz. lithological map, slope map in degree, land-use land cover map, lineament map and lineament density map, drainage map, soil map, and Geomorphological map were transformed into a raster data format using the tools in ArcGIS. The raster maps of these factors are allocated a fixed score and weight computed from multi influencing factor (MIF) technique. Moreover, each weighted thematic layer is statistically computed to get the groundwater potential zones. Thus, Five different groundwater potential zones were identified, namely 'very good', 'good', 'moderate', 'poor' and 'very poor'. Thus, the above study has clearly demonstrated the capabilities of Remote Sensing and GIS in the demarcation of the different ground water potential zones in hard rock terrain, particularly in such a diverse geological set up.

Keywords: Ground water, hard rock, RS&GIS

INTRODUCTION

Next to air, water is the most essential commodity for life. It is not only a great source for the man to live and produce food for living beings, but also a great preservative substance of life and an important element for the sustenance of life. Water is the basis of all life on earth. It is the resource upon which the foundation of the animal kingdom rests. To flourish and prosper, the human race depends upon water for its multiple needs in the centers of civilization. Be it a labyrinthine metropolis or a verdant expanse of cultivated area, water is essential, but the resource is under threat owing to the mindless exploitation and burgeoning population, in several hard rock areas, groundwater is fresh water because of replacement of atmospheric water (Sahu and Sahoo, 2006; Stuyfzand and Stuurman 1994; Post and Abarca 2010; Werner and Gallagher 2013).

Satellite statistics provide primary and prompt information of various parameters like geomorphology, landforms, and lineaments, land cover broadly controlled in detection, occurrence and movement of ground water potential. (Gautam and Biswas 2016; Sharma and Biswas 2013; Sharma et al. 2014). A rapid advance in the improvement of GIS ensures spatial data integration and acts a reliable and successful tool for natural resource management and ground water investigation studies. Remote sensing is a technique used for geographical studies, especially in land surveying and earth science studies, like hydrology, ecology, meteorology, oceanography, glaciology, geology. This remote sensing technique along with combination of GIS has proven to be an efficient tool in ground water detection studies. The assimilation of GIS and remote sensing data has established as a versatile tool in ground water studies, where remote sensing serves as the preliminary discovery method to detect the groundwater scenario and GIS enables integration and management of multi-thematic data. Earlier and at present numerous articles have been published on the study of ground water development using the RS and GIS techniques which the present authors cites the articles such (Sahu 2017; Acharya et al., 2017; Nandi, et al. (2014, 2015), Saraf and Choudhury 1998; Jaiswal et al., 2003; Sener et al., 2005; Chowdhury et al., 2009; Jha et al., 2010). Have used GIS data to demarcate possible groundwater zone, while Sreedevi et al. (2001) have utilized RS techniques to trace the potential ground water zones. In addition, other researchers have adopted remote sensing and GIS techniques for groundwater exploration of ground water includes (Behera SC, 1989; Selvam et al., 2015a, Yeh et al. 2014; Yeh et al., 2016; Jha et al., 2010;

Saraf and Choudhary 1998, Kamaraju et al., 1995; Krishnamurthy et al. 2000, have used GIS technology for processing and interpretation of groundwater quality data.

The objectives of this study are to set up various thematic maps of Harbhanga block such as Geology, Geomorphology, Soil, Slope, Drainage & its density, Landuse/landcover, soil from toposheet, satellite imagery and ground truth data. To identify the groundwater potential zone by assigning weightage for each theme based on MIF technique, and contribute a systematic groundwater delineation study.

STUDY AREA

The selected area for this study is Harabhanga block of Boudh district in Odisha State. This Harabhanga block area has delineated groundwater potential zones comprising of 13% groundwater development in hardrock terrain region. The geographical location of Harabhanga block lies between the latitude $20^{\circ} 62' 30''$ and longitude $84^{\circ} 61' 22''$. It is situated 292 meters above sea level. It belongs to the hard rock terrain and dense forest area. The total population is approximately 441162 (as per 2011 census). The average annual rainfall in the district is 1623 mm. It is spread over an area of 3098 sq. km. It falls in the Survey of India Toposheet numbers 73D and 64P.

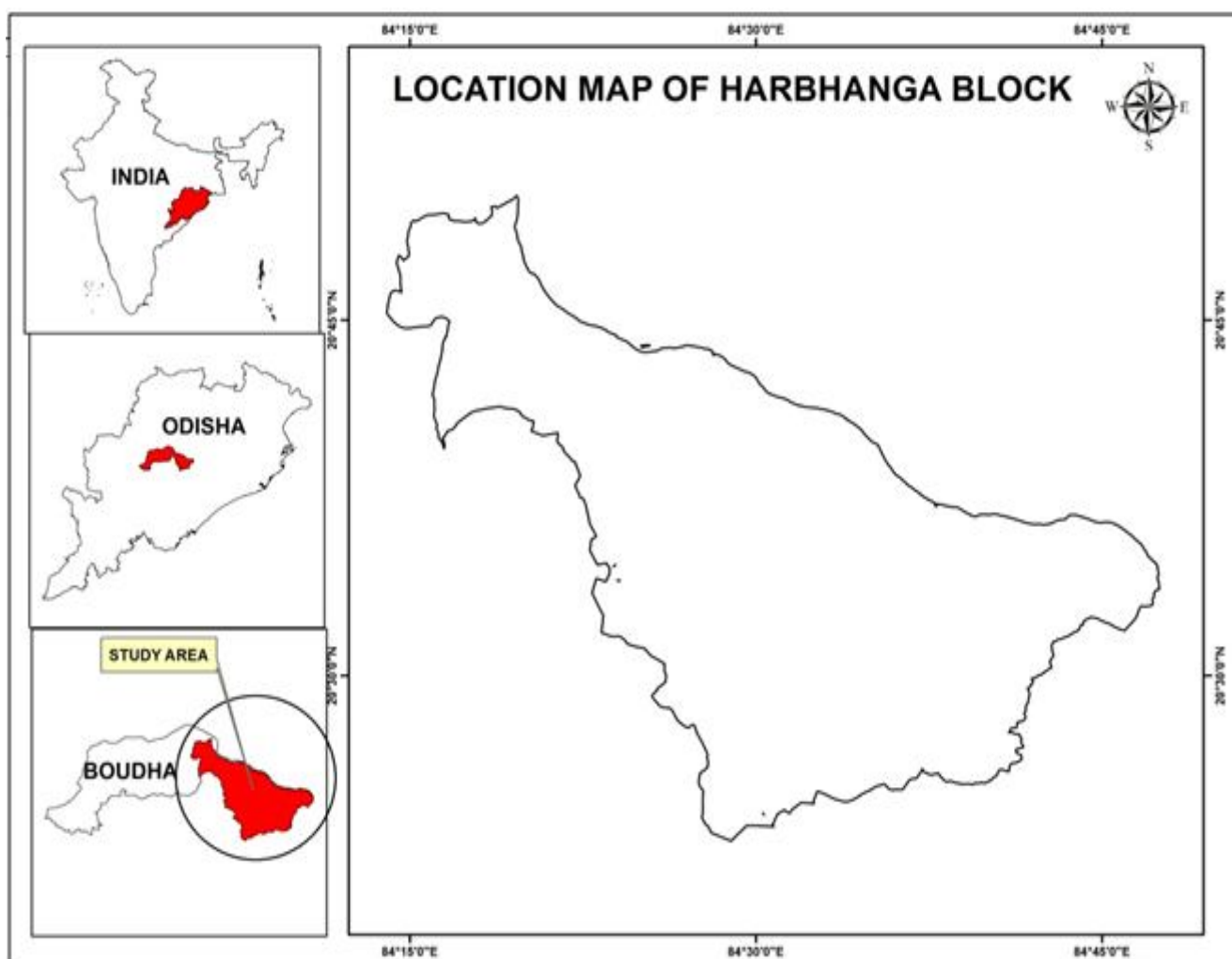


Fig-1: Location of the study area

Methodology

All thematic maps of Harbhanga Block was prepared by Survey of India topo sheets on a 1:50,000 scale. All drainage systems for the study area were digitized in ArcGIS 10.2.2 version. The slope map was prepared from CARTOSAT DEM data by ArcGIS Spatial Analyst module. The drainage density map and lineament density map of Harbhanga block were prepared by ArcGIS. For preparation of thematic layers such as land-use map, geological map, lineament map, and soil type map of Harbhanga block were prepared by using Satellite images from IRS-1C, LISS-III sensor. All the thematic layers were converted to a raster format. The groundwater potential zones of Harbhanga block were calculated by overlapping all the thematic maps in terms of weighted overlay methods using the spatial analysis tool. During weighted overlay analysis of Harbhanga block, the ranks were given for each individual parameter of each thematic map, and weights were assigned.

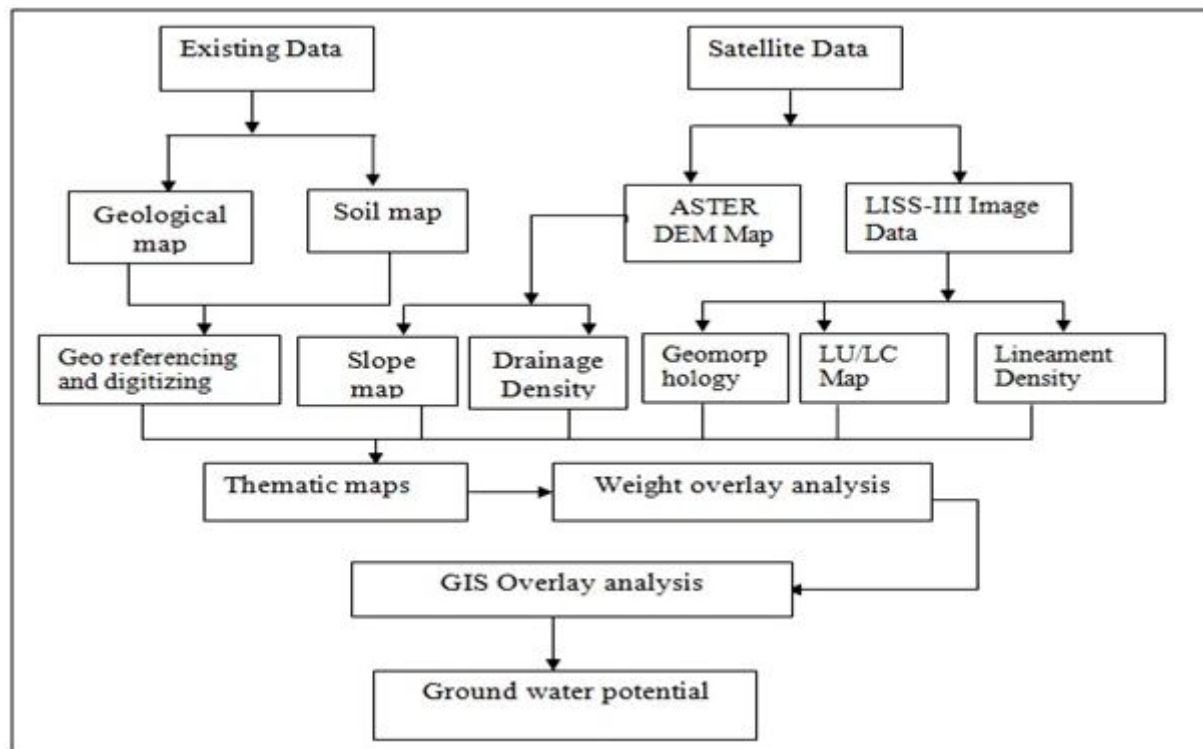


Fig-2: Flowchart for groundwater potential zone using Geospatial techniques

RESULT AND DISCUSSION

Geology

The district is mostly underlain by Archean crystalline of Eastern Ghat facies with limited patches of lower Gondwana sandstone and recent alluvium. The district is composed of consolidated formation containing Granites Gneiss, Migmatite and Augen Gneiss. The district is composed of Semi consolidated formation containing lower Gondwana formations in the western side. Laterites and alluvium of Sub-recent to recent age constitute the unconsolidated formation. These rocks lack Primary porosity. Ground water occurrence is restricted to weathered and fractured zone. Ground water occurs in unconfined and confined aquifer condition.

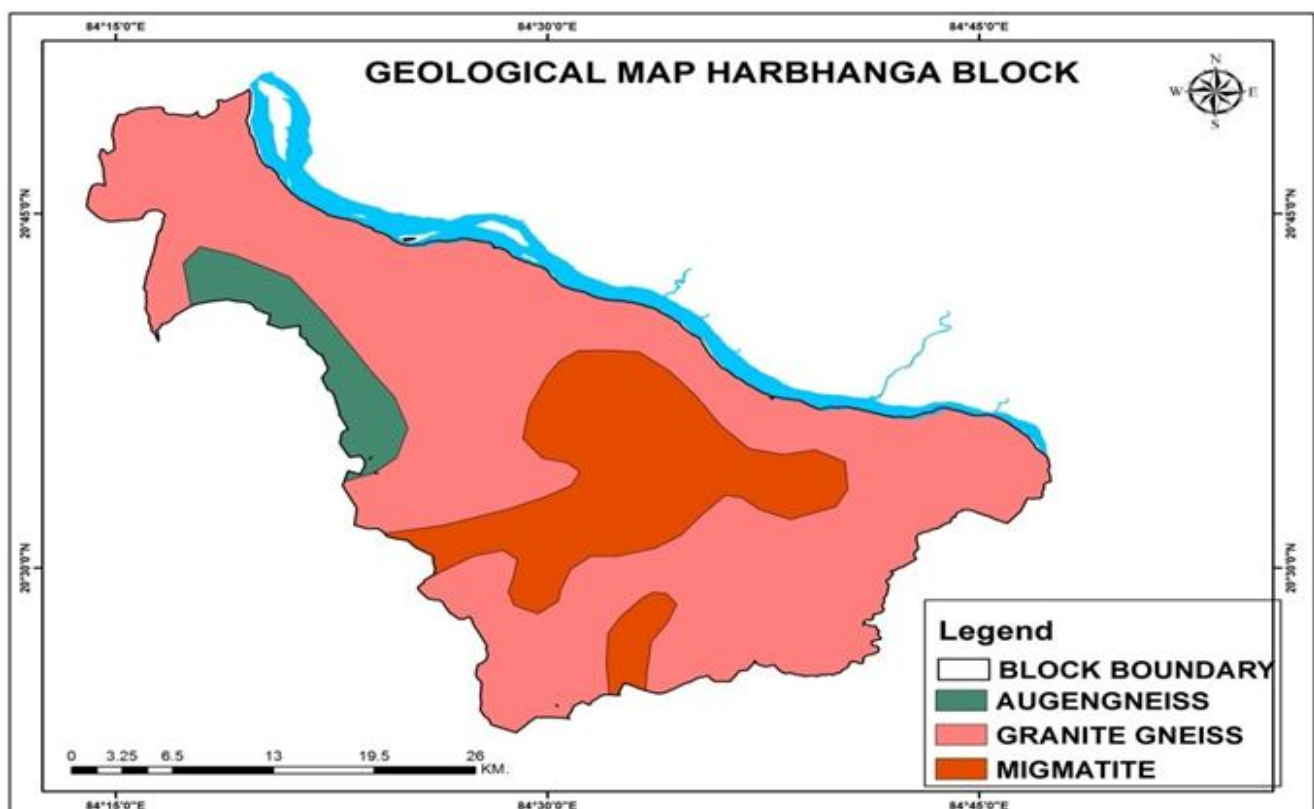


Fig-2: Geological Map of the study area

Hydro Geomorphology

Hydrogeomorphological study shows that there is a close relationship between the hydrogeomorphic units and groundwater resources (Subba Rao and John Devada 2003). Geomorphological units are extremely helpful for delineating groundwater potential zones and artificial recharge sites (Elango et al. 2003). By taking image interpretation characteristics such as tone, texture, shape, colour and association over the geocoded FCC image, the geomorphologic units and landforms are interpreted. The geomorphological feature of the Harbhanga block are Denudational Hill 1%, Habitation .09%, Intermontane Valley 4.4%, Paddy plain 52%, Plateau 0.18%, Shallow weathered/ shallow buried Pediplain 22.11%, Structural Hills 2%, Valley Fill/ filled-in valley 6.3%, Water Body .76%.

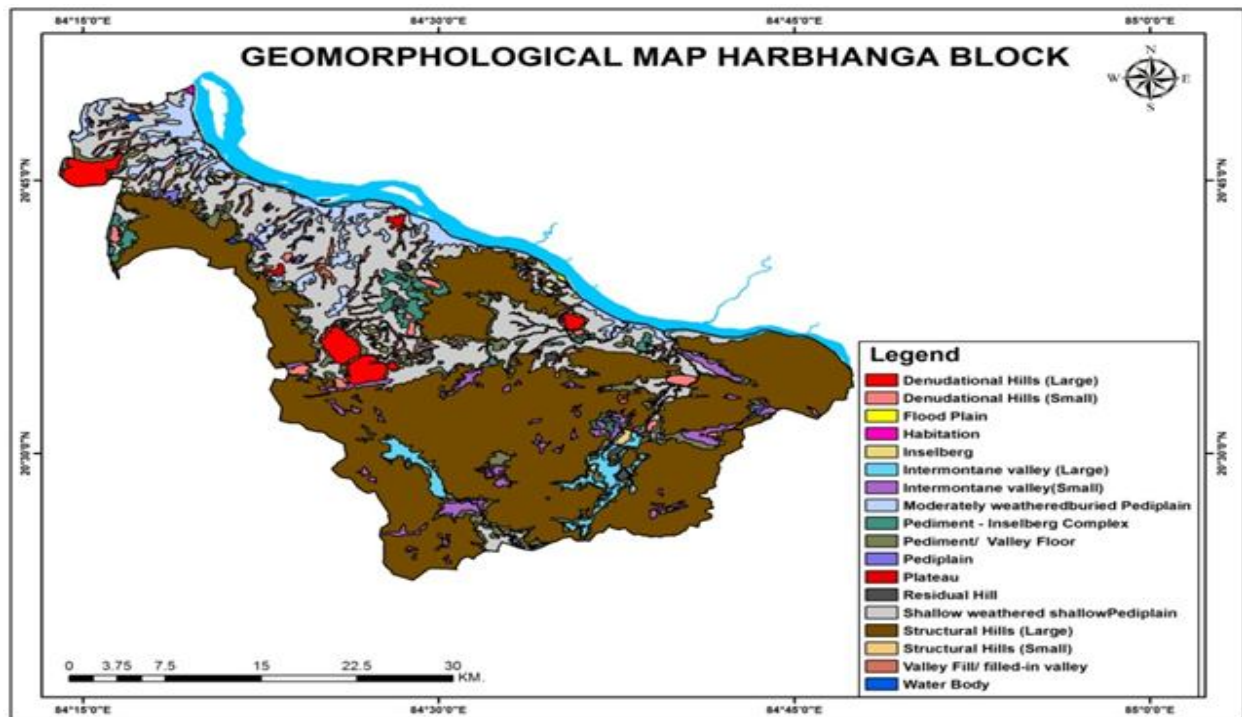


Fig-2: Geomorphological Map of the study area

Lineament density

Lineaments are structurally controlled linear or curvilinear surface expression of zones of weakness or structural displacement in the crust of the earth features, which are identified from the satellite imagery by their relatively linear alignments. Lineament density of an area has a major role for the groundwater potential. High lineament density is good for groundwater potential zones (Haridas et al., 1998). In hard rock terrain lineaments and fractures act as principal conduits in movement and storage of groundwater. The lineament map is shown in Fig. 3.

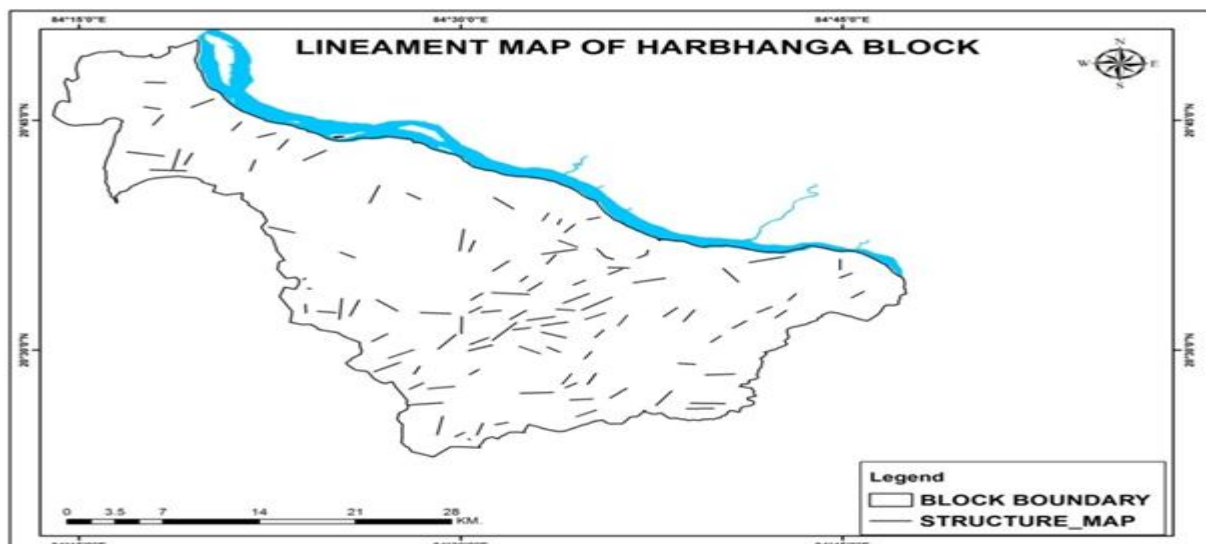


Fig-3: Lineament Density Map of Harbhanga Block

Drainage Density

Drainage density is specified as the closeness of spacing of river channels. It is a measure of the total length of all the orders per unit area. The drainage density is inversely proportional to permeability. The less permeable rock in which conversely tends to be concentrated in surface runoff. Drainage density of the study area is calculated using Arc GIS tools..The map is shown in Fig.4.

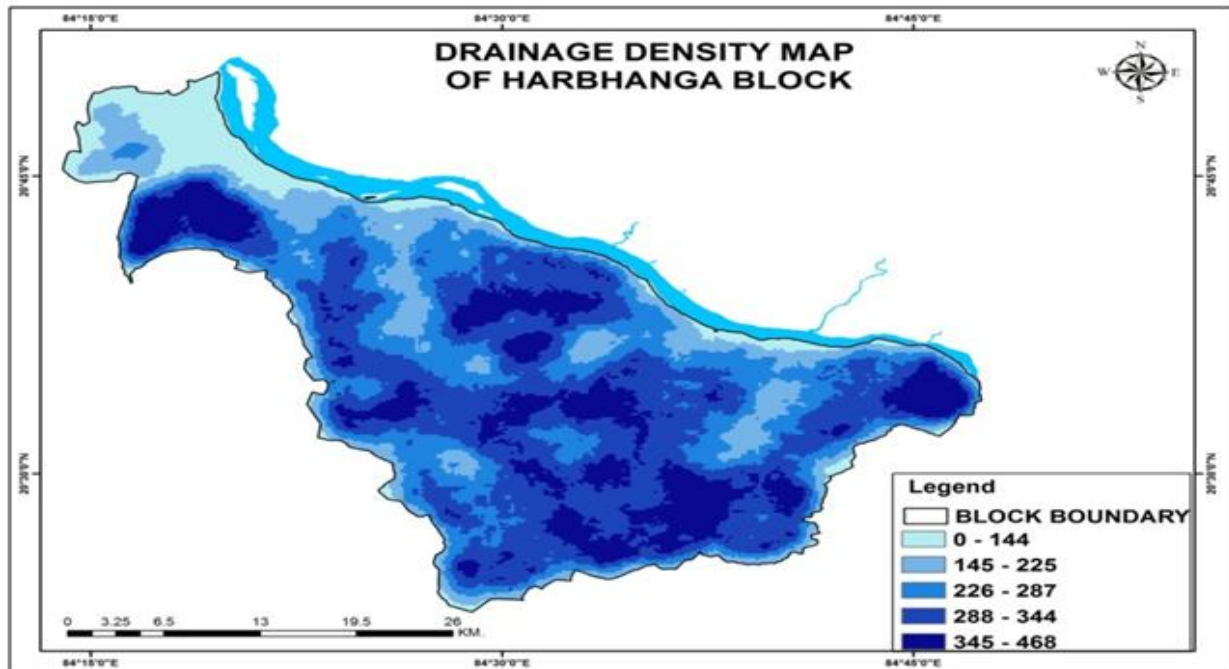


Fig-4: Drainage and Drainage Density Map of Harbhanga Block

Slope

The Slope is one of the major factors which influence on groundwater potential. From the slope of the study area, we found that the most of the steep slope is in the southeast of the Harbhanga block. Based on slope the study area is divided into four classes. The area under 0 degree to 4 degree is very low, 4 degree to 11 degree is low, 11 degree to 18 degree highly moderate, >52 degree considered as very poor due to high slope and runoff.

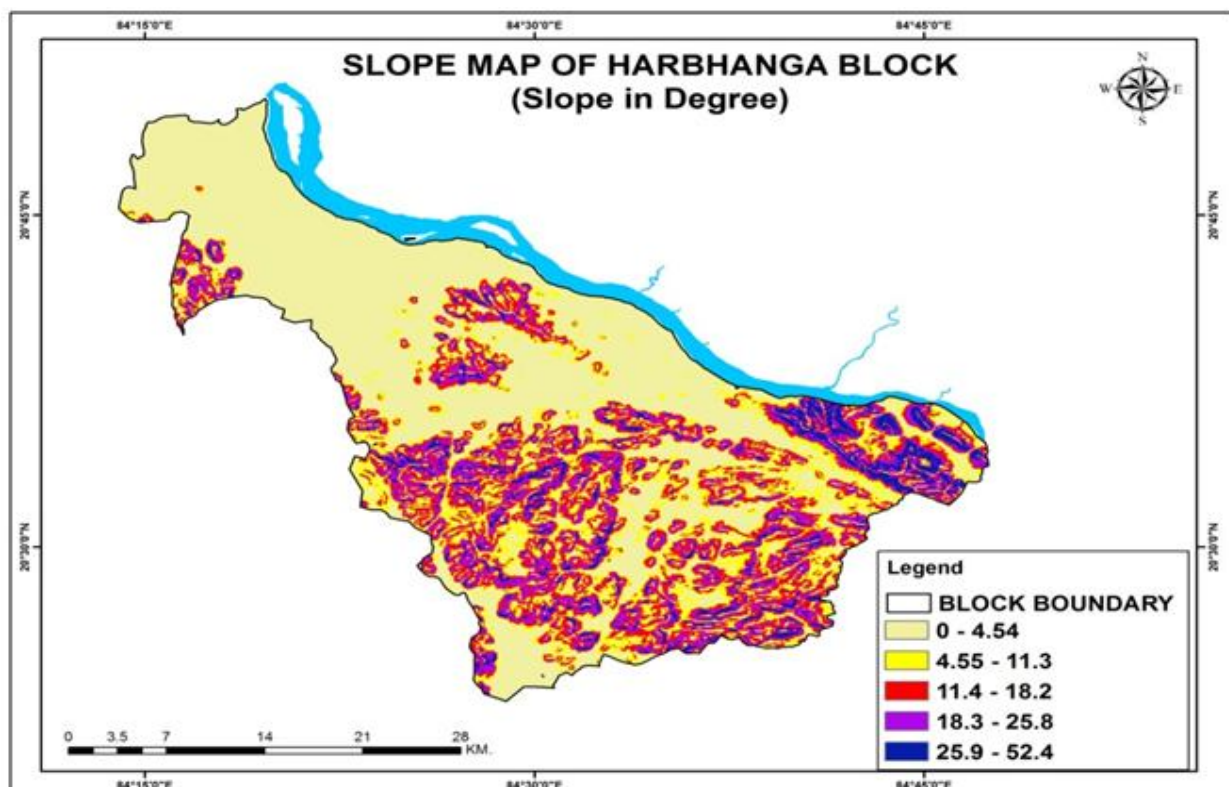


Fig-5: Slope Map of Harbhanga block

Soil

Soil is a one of the important factor for the delineating ground water potential zone. The soil acts as a natural filter and penetration of surfacewater into an aquifer system and directly related to rates of infiltration, percolation and permeability. The movement and penetration of surface water into ground is based on the porosity and absorbency of soil. The result of soil classification found that, the study area has six types of soils such as, Sand, Sandy Loam, Sandy Clay, Clay, Clay Loam and Loamy soil. The soil map of the study area is shown in Fig. 6.

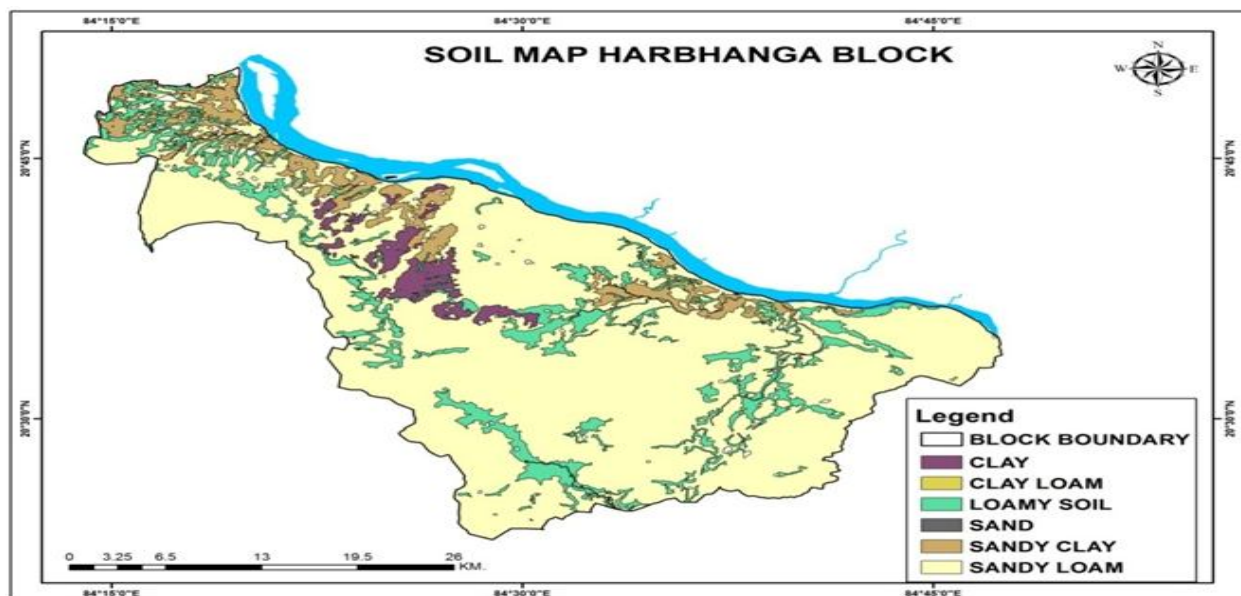


Fig-6: Soil type Map of Harbhanga block

Land use land cover

Land use/land cover map was prepared using Liss-III image Carto Sat Remote Sensing Data. The data was digitally classified in ERDAS 10.0 Software package using supervised classification technique. The parallelepiped supervised classification technique was applied to extract different types of thematic layers. The study area has five major land use class i.e forest, agriculture land, Waste land, Settlement and water bodies. The weights were assigned according to influence on groundwater occurrence. Water bodies are coming under good categories and Lands which are not used for any purpose classified as wasteland and Built up land is categorized as Poor for groundwater prospects. Agriculture is categorized as moderate categories groundwater occurrence, holding and recharge.

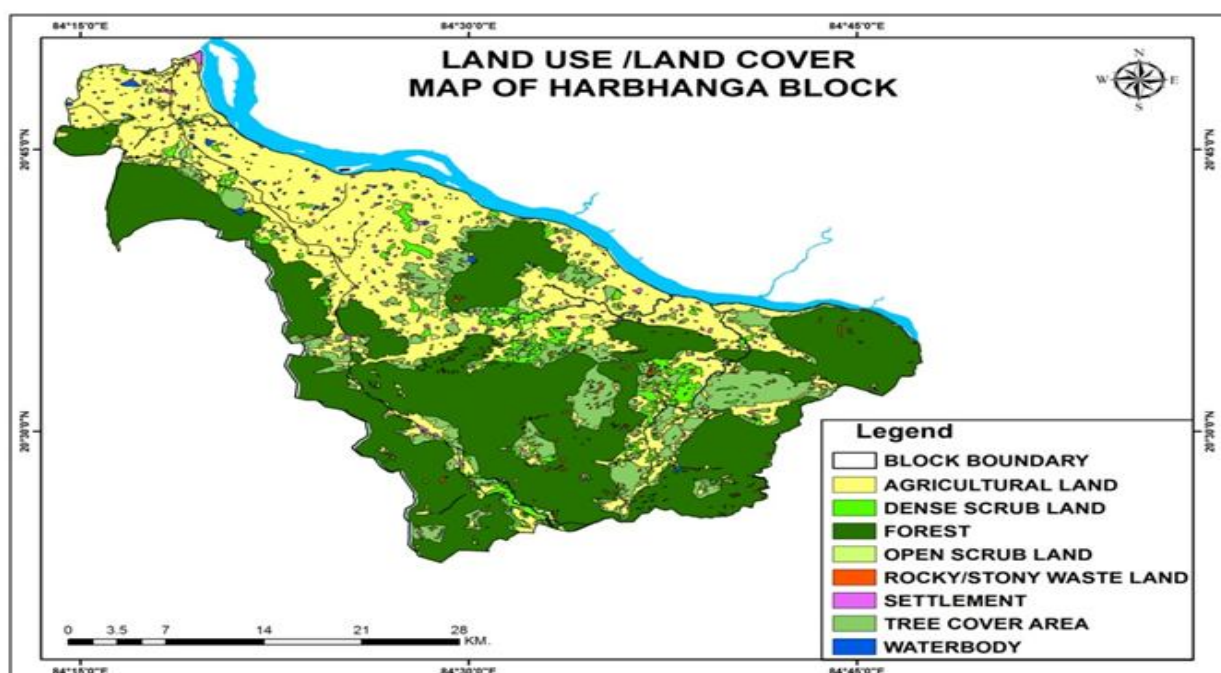


Fig-7: Land use/ Land cove map of the study area

Weight assignment and Geospatial modeling

Depending on the groundwater potentiality suitable weights were assigned to the seven themes according to their hydrogeological importance in groundwater occurrence in the study area. The normalized weights of the individual themes and their different features were obtained through the Saaty's analytical hierarchy process (AHP). The weights assigned to different themes are presented in Table 2. After deriving the normal weights of all the thematic maps are converted into raster format and superimposed by weighted overlay method and all the thematic layers were integrated with one another using spatial analysis of Arc-GIS software to delineate groundwater potential zones in the study area. The final integrated layer was divided into five equal classes, i.e. 'very good', 'good' 'moderate', 'poor' and 'very poor' in order to delineate groundwater potential zones.

Table-1: Ranks assigned to different parameters used for overlay

SI No	Parameters	Classes	Feature score	Map Weight
1	Geomorphology	Denudational Hills (Large) Denudational Hills (Small) Habitation Intermontane valley/ Structural Valley (Small) Pediment/ Valley Floor Pediplain Plateau Shallow weathered/ shallow buried Pediplain Structural Hills (Large) Valley Fill/ filled-in valley Water Body	1 1 1 8 8 2 7 2 6 6 2 8 10	25
2	Slope classes	0 to 4 4 to 11 18to 21 >21	8 6 3 1	18
3	Drainage density (Km/Km ²)	0-93 93-186 186-280 280-373 373-467	9 7 6 4 3	10
4	Lineament density (Km/Km ²)	0 - 0.9 0.9 - 1.9 1.9-2.9 2.9-3.9	9 8 6 3	12
5	Land use /land cover	Agriculture Land Built up land Forest land Water body Waste land	8 2 6 9 3	15
6	Geology	Granite Granite Gness Migmatite Augen Gness	1 1 2 1	15
7	Soil	Clay Clay loam Sand Sandy clay Sandy loam	1 2 8 3 2	5

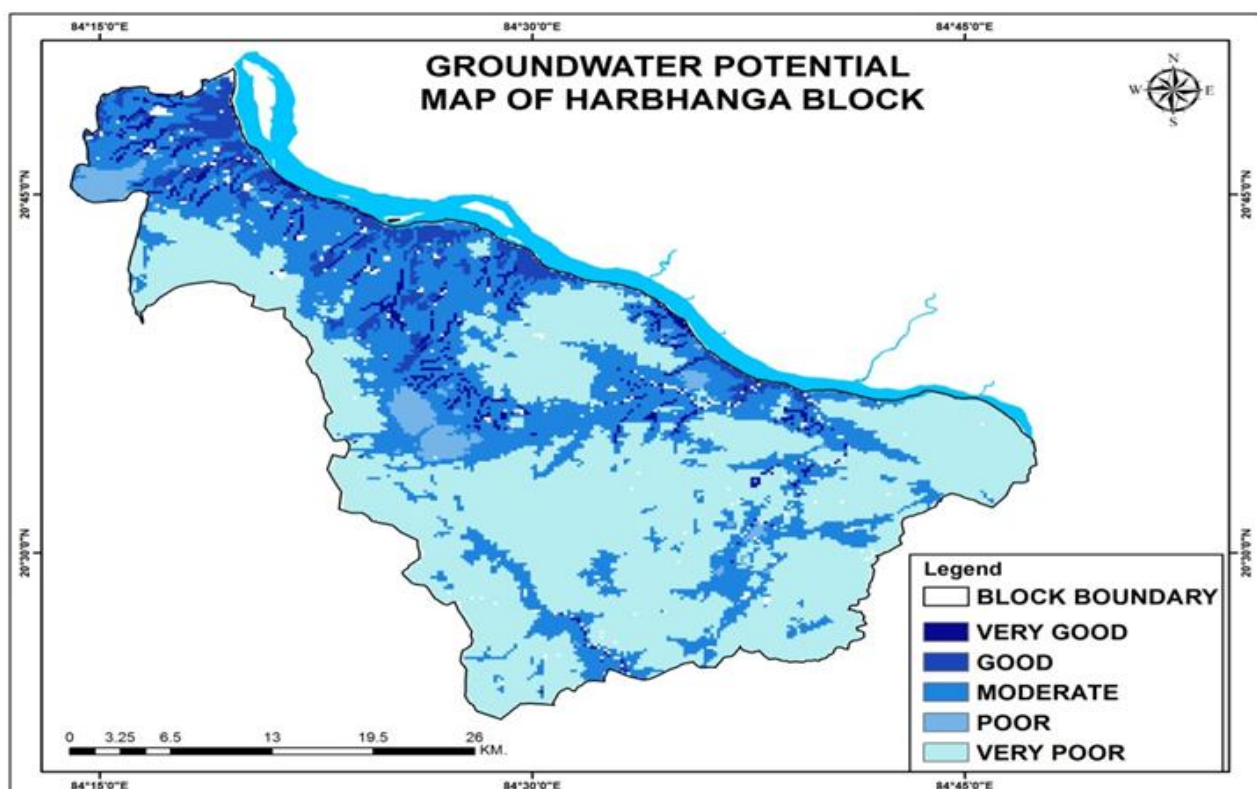


Fig-8: Ground water prospect zone Map of Harbhanga block

CONCLUSIONS

Delineation of the groundwater potential zones in Harbhanga block of Boudh district using Remote sensing and GIS techniques is found efficient to minimize the time, it enables quick decision-making for sustainable water resources management. Satellite imageries, topographic maps and conventional data were used to prepare the thematic layers of lithology map, lineament density map, drainage density map, slope map, soil map, land-use land cover and slope map. The various thematic layers are assigned proper weightage and then integrated in the Arc GIS tools to prepare the groundwater potential zone map of the study area. According to the groundwater potential zone map, the block is categorized into five different zones, which are 'very good', 'good', 'moderate', 'poor', and 'very poor'. The most of the area of Harbhanga block is under very poor groundwater potential zone i.e 65 square kilometer. And the good groundwater potential zone is 3 square kilometer.

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TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) PREPAREDNESS OF THE TEACHER CANDIDATES IN PRE-SERVICE PROGRAM

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ABSTRACT

Technology is changing at a faster pace and provides varied avenues for its integration in education. Teachers should be well equipped and know about the challenges they need to face for making learning interesting and achievable for learners. This study was conducted to identify the preparedness of the pre-service teacher candidates of The Maharaja Sayajirao University (MSU) of Baroda, India, for using technology in the classroom during practice teaching. The data was collected from the teacher candidates in their first year of Bachelor of Education (B.Ed.) program (2015-16) at The Maharaja Sayajirao University (MSU) of Baroda India. The TPACK survey tool was given to the teacher candidates and the data was analyzed by calculating frequency and percentages for the responses obtained. The results of the study provide insights in the area of techno-pedagogy & content interplay in teaching-learning situation. It also highlights the priority areas in teacher preparation program.

Keywords: techno-pedagogy, TPACK, teaching-learning

INTRODUCTION

Rapid technological changes make teaching with technology more complicated. Introduction of computers and other related tools have modernized education with e-learning, video conferencing, chat rooms, bulletin boards and smart board technologies. According to Wilson (2007) the learner is at a greater understanding and advantage than ever before in the history of education. There is a greater need to build further awareness about teaching methodologies, learning strategies, and learning with growing technological advantages.

Research studies have indicated trends related to teachers' interest in use of technology in the classroom (Grunwald Associates, 2011). Which shows that teachers are interested in infusing technology in their lessons. Hence, it is the pre-service teacher preparation program that can bring impact on the teachers' preparedness for using and integrating technology in the classroom.

The new digital technologies present newer challenges to teachers who are struggling to use technology in their teaching. Every technology has its pros and cons while utilizing. Many times it is found that social and institutional contexts are often unsupportive of teachers' efforts to integrate technology in their classrooms. An appropriate approach is needed to integrate right technology in a given context. Hence, three core components: Content, Pedagogy, and Technology becomes important while integration of technology in teaching.

Koehler and Mishra (2005) established the relationship among all three types of knowledge: Content knowledge (CK), Pedagogical knowledge (PK) and Technology knowledge (TK) and gave the core of the technology, pedagogy, and content knowledge (TPACK) framework. Content knowledge (CK) is teachers' knowledge about the subject matter to be learned or taught. Pedagogical knowledge (PK) is teachers' deep knowledge about the processes and practices or methods of teaching and learning. Technology knowledge (TK) is working with technology that can be applied to all technology tools and resources. Pedagogical Content Knowledge (PCK) is applicable to the teaching of specific content. Technological Content Knowledge (TCK) is an understanding of the manner in which technology and content influence & constrain one another and Technological Pedagogical Knowledge (TPK) is an understanding of how teaching and learning can change when technologies are used in specific ways. Technology, content knowledge and pedagogical knowledge together form the technological pedagogical content knowledge (TPACK), a transformed knowledge through proper interactions of CK, PK and TK. For effective teaching, amalgamation of all three components is essential and teachers should have skills to use TPACK in the classroom. Thus, it is necessary that pre-service teachers have basic ICT skills and competences to reap the full advantage of ICT in teaching with appropriate use of TPACK.

In order to understand the preparedness of novice teachers to use technology effectively in the classrooms, the study was taken up to know the courses and opportunities the teacher candidates have in their pre-service training program.

THE STUDY

The study was designed to investigate the perception of preservice teachers as to the development of their TPCK-related competencies through their participation in the courses and practice teaching experiences during their first year of B.Ed. program. The participants of the study were the teacher candidates in their first year of pre-service program, department of education, The M.S. University of Baroda, India. Twenty-two teacher candidates were selected from a total of hundred teacher candidates having science, chemistry, Physics or biology as their teachable subjects. The self-reporting survey developed by Schmidt, D., Baran, E., Thompson, A. Koehler, M.J., Shin, T., and Mishra, P. (2009), was used to study the Technological Pedagogical Content Knowledge (TPACK). Teacher students was asked to indicate the extent to which they agreed with a number of statements that referred to the technology-dimensions (1= I completely disagree, 5 = I completely agree). The general TPACK factor was measured by 14 items that tapped TPCK, TPK, and TCK (Cronbach's $\alpha = .94$), whereas the TK scale was measured by 7 items (Cronbach's $\alpha = .89$). The data collected was analyzed by calculating frequency and percentages of the responses, also intensity index for each statement was calculated to know the relative weightage for a given statement.

FINDINGS

The responses of the teacher candidates on statements related to the knowledge of technology, content knowledge and pedagogical knowledge was analyzed and is presented below.

Table-1: Analysis of responses of teacher candidates with regard to the Technological Knowledge

Sr. No.	Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Intensity Index
1	I know how to solve my own technical problem	1 (4.76 %)	1 (4.76 %)	8 (38.10%)	9 (42.86%)	2 (9.52%)	3.47
2	I can learn technology easily	-	2 (9.52%)	1 (4.76%)	11 (52.38%)	7 (33.33%)	4.09
3	I keep up with important new technologies	-	3 (15.00%)	4 (20.00%)	13 (65.00 %)	-	3.5
4	I frequently play around the technology	1 (4.76%)	6 (28.57%)	3 (14.29%)	11 (52.38%)	-	3.14
5	I know about a lot of different technology	-	7 (33.33%)	7 (33.33%)	6 (28.57%)	1 (4.76%)	3.04
6	I have the technical skills I need to use technology	1 (5.00%)	4 (20.00%)	4 (20.00%)	10 (50.00%)	1 (5.00%)	3.3
7	I have had sufficient opportunities to work with different technologies	1 (5.26%)	7 (36.84%)	5 (26.32%)	5 (26.32%)	1 (5.26%)	2.89
Average Intensity Index							3.35

Looking to the above responses of teacher candidates given in Table 1, it can be said that teacher candidates did not have sufficient opportunities to work with technology and had limited knowledge of technological know-how, although student teachers have technical skills and ability to learn new technology. This indicates that teacher candidates were interested in spite of their limited knowledge of technological know-how. If given opportunity to explore new technology teacher candidates can learn and make difference in imparting knowledge. This is the reason that novice teachers often feel not prepared to effectively use technology in their classrooms (e.g., Sang, Valcke, van Braak, & Tondeur, 2010). The courses need to be offered at pre-service level to introduce teacher candidates to the different technological avenues that can be applied in education. These findings are supported by Tondeur, Scherer, Siddiq, and Baran (2017) that technology integration is associated with the technology profile of the teacher candidates.

Table-2: Analysis of responses of student teachers with regard to the Content Knowledge

Sr. No.	Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Intensity Index
1	I have sufficient knowledge about various concepts to be taught	-	2 (9.52%)	3 (14.29%)	13 (61.90%)	3 (14.29%)	3.80
2	I can use scientific ways of thinking	-	-	2 (9.52%)	14 (66.67%)	5 (23.81%)	4.14
3	I have various ways and strategies of developing my understanding of content to be taught	-	4 (19.05%)	3 (14.29%)	10 (47.62%)	4 (19.05%)	3.67
Average Intensity Index							3.87

With regard to the content knowledge as presented in Table 2 there was not much difference in the responses in terms of having sufficient content knowledge, scientific way of thinking, and ways and strategies for understanding content to be taught. This is probably due to the fact that majority of the teacher candidates attended the B.Ed. or certificate in teaching program immediately after completing their undergraduate program which shows that their content knowledge was well grounded. Teacher candidates can make classroom technology integration possible when they have comprehensive understanding related to relationships between the three components of knowledge-TK, CK, and PK (Thomas, Herring, Redmond, & Sonaldino, 2013).

Table-3: Analysis of Repones of student teachers with regard to the Pedagogical Knowledge

Sr. No.	Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Intensity Index
1	I know how to assess student performance in a classroom	-	1 (5.00%)	3 (15.00%)	15 (75.00%)	1 (5.00%)	3.8
2	I can adopt my teaching based-upon what student currently understand or do not understand	-	1 (4.76%)	4 (19.05%)	10 (47.62%)	6 (28.57%)	4
3	I can adopt my teaching style to different learners	-	1 (5.00%)	5 (25.00%)	8 (40.00%)	6 (30.00%)	3.95
4	I can assess student learning in multiple ways.	-	1 (5.00%)	5 (25.00%)	8 (40.00%)	6 (30.00%)	3.95
5	I can use wide range of teaching approaches in a classroom setting (collaborative learning, direct instruction, inquiry learning, problem/project-based learning)	-	2 (9.52%)	3 (14.29%)	13 (61.90%)	3 (14.29%)	3.81
6	I am familiar with common student understanding and misconceptions	-	2 (9.52%)	7 (33.33%)	7 (33.33%)	5 (23.81%)	3.71
7.	I know how to organize and maintain classroom management	-	3 (15.00%)	2 (10.00%)	12 (60.00%)	3 (15.00%)	3.75
Average Intensity Index							3.85

From Table 3 it is revealed that teacher candidates can adept their teaching as per the need of the students. Teacher candidates stated that the teacher education program helped them in learning how to engage students in the classroom using web resources. They mentioned the weakness of current teacher preparation program in terms of time allotted for internship and classroom teaching practices. Especially attending school once a week in the first phase was not enough for them to start teaching at school. Although, teacher candidates had sufficient knowledge and confidence with regard to engaging students in learning but had little and no scope for adopting teaching styles to different learners or assessing students in learning multiple ways. The reason being a large class size with a single teacher to meet the needs of individual students. Further with limited exposure and experience in school set up the teacher candidate's familiarity with common student understanding and misconception was limited. The findings suggest that teacher candidates be trained in several areas such as teaching strategies, content delivery methods using technology (Mouza, Karchmer-Klein, Nandakumar, Ozden & Hu, 2014). Because pedagogical content knowledge is also an important element for integrating technology (Pamuk, 2012).

Table-4: Analysis of student teachers' responses with regard to the Pedagogical Content Knowledge

Sr. No.	Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Intensity Index
1	I know how to select effective teaching approaches to guide student thinking and learning in science.	-	3 (14.29%)	2 (9.52%)	14 (66.67%)	2 (9.52%)	3.71
2	I know about technologies that I can use for understanding and doing science.	-	1 (4.76%)	3 (14.29%)	16 (76.19%)	1 (4.76%)	3.81
Average Intensity Index							3.76

Table-5: Analysis of student teachers' responses with regard to the Technological Pedagogical Knowledge

Sr. No.	Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Intensity Index
1	I can choose technologies that enhance the teaching approaches for a lesson	-	2 (9.52%)	4 (19.05%)	9 (42.86%)	6 (28.57%)	3.90
2	I can choose technologies that enhance the students learning for a lesson	-	1 (4.76%)	1 (4.76%)	15 (71.43%)	4 (19.05%)	4.04
3	My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom	-	1 (4.76%)	1 (4.76%)	7 (33.33%)	12 (57.14%)	4.43
4.	I am thinking critically about how to use technology in my classroom	-	2 (9.52%)	2 (9.52%)	14 (66.67%)	3 (14.29%)	3.86
5	I can adopt the use of technologies that I am learning about to different teaching activities.	-	-	-	18 (85.71%)	3 (14.29%)	4.14
Average Intensity Index							4.076

Table 4 and 5 suggest that internship program gave exposure to the teacher candidates to practice different methodology for classroom management. It created opportunity for the teacher candidates in various ways like implementing instructional strategies, integrating technologies. But there was limited scope in terms of assessing student understanding or using varied tools of assessment. These findings were supported by Özgün-Koca, Meagher, and Edwards (2010) research showing that teacher modelling technologically enhanced learning activity in the classroom helped teacher candidates develop their understanding of technological-pedagogical understanding. In support to these findings it can be stated that teacher modelling technological classroom presentation will suffice teacher candidates experience.

This will help teacher candidates in having an idea for technology integration in the classroom (Kaufman, 2015). Teacher candidates be also given opportunity to reflect upon these examples and discuss various opportunity to integrate technology in a given context before they implement in the real classroom situation (Tondeur, Scherer, Siddiq, & Baran, 2017)

Table-6: Analysis of responses with regard to TPACK

Sr. No.	Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Intensity Index
1	I can teach lesson that appropriately combine sciences, technologies and teaching approaches	-	1 (4.76%)	3 (14.29%)	13 (61.90%)	4 (19.05%)	3.95
2	I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn	-	1 (4.76%)	-	15 (71.43%)	5 (23.81%)	4.14
3	I can use strategies that combine content, technologies and teaching approaches that I learnt in my coursework in my classroom	-	1 (4.76%)	1 (4.76%)	19 (90.48%)	-	3.85
4	I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school/or district	-	3 (14.29%)	6 (28.57%)	10 (47.62%)	2 (9.52%)	3.52
5	I can choose technologies that enhance the content for a lesson	-	-	3 (14.29%)	16 (76.19%)	2 (9.52%)	3.95
Average Intensity Index							3.89

Table 4, 5, and 6 shows that teacher candidates had fair knowledge and understanding of pedagogical content knowledge, technological pedagogical knowledge but when it comes to the application of technology in teaching learning process teacher candidates feel uncomfortable. This indicates there is need for extensive practical exposure to use technology in the classrooms, more opportunity to integrate and use technology. The modeling of technology applications for teaching-learning in classroom as well as the exposure to classroom

practices adopted by school's teachers in real life context will be great experience for teacher candidates. Teacher education equips student-teachers with theoretical basis for techno-pedagogy but lacks practice and practical exposure for the teacher candidates to practice in real classroom situations particularly in the case of Indian classrooms where there is big strength of students in a classroom. As per Figg and Jaipal (2009) TPK characteristics plays the most significant role in successful planning and implementation. Also, recent studies on the technology have shifted from the emphasis on the technology skills alone to integrating pedagogy and content with technology (Kharade & Peese, 2014).

CONCLUSIONS

From the above study it can be said that the student teachers need a lot of practice, exposure and opportunities to apply technology in actual classroom situation because technology integration poses its own challenges and the solution to those challenges emerges through practice. The National level initiatives of the University Grants Commission (UGC) and the Ministry of Human Resource Development (MHRD), Government of India to promote e-learning in K – 12 schools of the country have gained momentum over the years. E-learning in India needs special care to improve its quality and effectiveness while extending educational access throughout the country (Mishra, 2009). Over and above this the educational institutions be it schools, colleges or universities need to be equipped with well-maintained facilities for information communication technology. According to Raman and Raghu (2015) educational policy directives and the academic environment in India is rapidly growing and embracing educational technology in schools. Reddi and Sinha (2003) argue that “It needs to be understood that any new technology comes not merely with hardware and software, but with a learning and teaching style and grammar of its own, and that management practices need to be adapted in order to use the technologies effectively” (p. 252). Thus, with the change in the duration of the B.Ed. program from one year to two years, there is a lot of scope and opportunity for providing flexibility and freedom to teacher trainees during internship program. The internship program well planned will help in preparing teachers with skills needed for tomorrow's classrooms.

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A STUDY ON THE ATTITUDE OF THE TEACHER-TRAINEES OF THE SELF- FINANCING B.ED. COLLEGES TOWARDS THE EXISTING NCTE B.ED. SYLLABUS

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ABSTRACT

Attitude is an important psychological variable in testing the inclination of the individuals concerned. In the domain of teacher education the attitude happens to be a significant dimension that prompts the teacher-trainees to examine their experimental standpoint on multiple factors relating to teacher education program. Taking this perspective into account the investigator made up his mind to investigate the attitude of the secondary teacher-trainees pursuing their B. Ed. course in the self financing teacher training institutions under The University of Burdwan. The attitude of the teacher-trainees belonging to selective private B. Ed. colleges of the districts of Birbhum and Purba Bardhaman are the target population of the present study. Four such colleges were selected for attitude survey. A opinionnaire comprising 36 statements were administered to the trainees and their responses were collected. Applying Likert-type scale their opinions were quantified. At last the scores were calculated and t-test was done to know the attitudinal differences between two different types of teacher-trainees, namely, male-female, deputed-fresher, etc.

Keywords: Attitude, Teacher Education, Secondary Teacher Trainees, B. Ed. Students

1. INTRODUCTION

B.Ed. is designated as 2 year Secondary Teacher Education Programme by N.C.T.E. which has formulated the following objectives :

- 1) To generate among teacher-trainees an awareness of the psychology of the pupils.
- 2) To make them competent by providing knowledge regarding latest scientific and methodological paradigms.
- 3) To enable them to apply the theoretically acquired knowledge into the practical classroom situation.
- 4) To enable them to apply the technological resources as available in the classroom situations to make learning more animating.

2. OBJECTIVES OF THE STUDY**The present study is directed**

- a) To find out the level of attitudinal difference between male B.Ed. and female B.Ed. students regarding their attitude towards the present NCTE B.Ed. Curriculum of the Burdwan University.
- b) To assess the difference in attitudes between the fresher male B.Ed. students and fresher female B.Ed. students regarding their attitude towards the present NCTE B.Ed. Curriculum of the Burdwan University.
- c) To estimate the difference between the deputed male B.Ed. and deputed female B.Ed. students regarding their attitudes towards the existing NCTE B.Ed. Curriculum of the Burdwan University.
- d) To enumerate the level of attitudinal difference between fresher B.Ed. students and deputed B.Ed. students regarding towards the presents NCTE B.Ed. Curriculum of the Burdwan University..

3. RATIONALE OF THE STUDY

B.Ed. being a professional course, skills and competencies are more the desired need than cumbersome theoretical framework of the curriculum. The teacher-trainees, in their mutual perspectives relating to the course differ significantly from one another.

As per recent NCTE regulations usually a B.Ed. institute can accommodate 100 students, among whom 50 students will belong to deputed category whereas 50 students will be fresher since (i) the deputed pupils possess some school teaching experience, their attitudes towards the B.Ed. course may be different from those of the fresher who enter the course having no or little practical experience regarding actual teaching learning situations.

In addition, two types of B.Ed. institutions are at work at the backdrop of teacher training in West Bengal. The first type B.Ed. institutions are govt. and govt. sponsored institutions which are run by financial assistance from the state Govt. The nature of the second type is private or self financing. These B.Ed. colleges are recognized by the NCTE and affiliated to the respective University. A large number of students are getting admitted to these

colleges since the number of govt. colleges is little in number. So a spirit of enquiry naturally cropped up in the mind of the investigator to know the attitude of these self-financing trainees towards the course.

4. HYPOTHESES

Keeping parity with the objectives framed by the investigator for his work the following hypotheses have been formulated.

H.1: There is significant difference between male B.Ed. and female B.Ed. students regarding their attitudes towards the presents B.Ed. curriculum of the Burdwan University.

H. 2: There would be significant difference between fresher male B.Ed. students and fresher female B.Ed. students regarding their attitude towards the present B.Ed. curriculum of the Burdwan University.

H.3: There would be significant difference between the deputed male B.Ed. and deputed female B.Ed. students regarding their attitude towards the existing B.Ed. curriculum of the Burdwan University.

H.4: There would be significant difference between fresher B.Ed. students and deputed B.Ed. students regarding their attitudes towards the recent B.Ed. curriculum of the University of Burdwan.

5. STATEMENT OF THE PROBLEM

The Problem under Study is Entitled

6. OPERATIONAL DEFINITIONS OF TERMS

Attitude

Attitudes are actually the projection of emotionalized mental state. Attitude is an underlying disposition, which enters along with influences, into the determination of a variety of behaviour towards an object.

B. Ed.

As per NCTE's specified definition B.Ed. is called Secondary Teacher Education Programme. This is the requisite qualification which is most sought after for teaching at Secondary stage.

Curriculum

Curriculum is the conceptual structure that encompasses the comprehensive activities that go on in the realm of teaching learning process. It is the blueprint that reflects the total educational activities and experiences.

7. REVIEW OF RELATED LITERATURE

Wai, Chan Kwok (1983) proposed an improvement of the qualities of non-graduate teacher by extending the pre-service training course. The author of the paper conducted a survey study of the two categories of student teachers in North Cote College of Education in May, 1981 with an attempt to seek their opinion, interest and need with reference to the curricula in the College of Education.

Annaraja ,P. & Josepe (2006) said that the introduction of ICT in education will encourage and motivate the student to explore new areas of advancement with reference to its latest in developments various subjects.

Gujjar, K. Aijaz Ahmed (2007) undertook a study to measure the attitude of students towards teacher Training programme through Distance Education offered by Allama Iqbal Open University, Islamabad, Pakistan. It was found that majority of the student appreciated the overall input of the programme though a few eyebrows were raised concerning the assessments of the assignments.

8. METHODOLOGY AND PROCEDURE

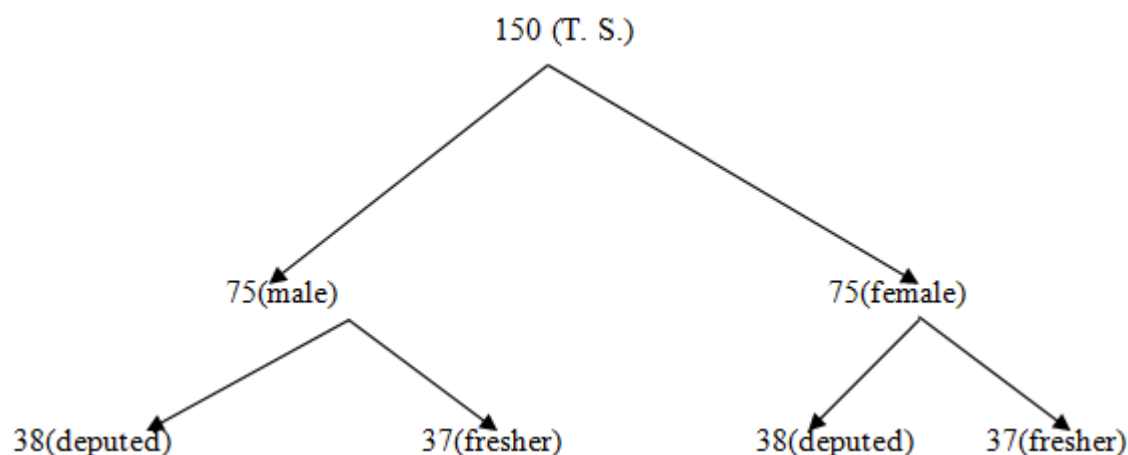
8.1. Area of the Study

For proper investigation the investigator selected the following govt. sponsored and self financing B.Ed. colleges for collecting samples under the district of Birbhum and Purba Bardhaman.

- 1) Sonartori College of Education, Gangatikuri, Purba Bardhaman
- 2) Provat Jyotirmoyee Educational Research Institute, Birbhum
- 3) Katwa College, B.Ed. Dept., Purba Bardhaman
- 4) Glorious College of Education, Birbhum

8.2 Samples

Purposive Random Sampling technique was conceived to be the best suited for selection of the sample of the present study. A total no 150 samples were collected from the above mentioned B.Ed. colleges under various categories of the female teacher-trainees for necessary investigation and analysis of data. The detailed break up of the samples is shown below through tree diagram:



8.3 Characteristics of the Sample

The samples consist of the B.Ed. Students from various private B.Ed. Colleges. 150 samples have been gathered from the above mentioned B.Ed. Colleges.

8.4 Variables

In research there are two types variables- Independent variables and dependent variables

a) Dependent Variable in the present study

Attitude: Attitude in the present study is one dependent variable which is dependent upon numerous independent variables such as gender and type of the teacher trainees.

b) Independent Variables

Two independent variables are considered in the present study. They are –

i) Gender of the teacher-trainees (male/female)

iii) Type of the teacher trainees: Deputed B.Ed. students and Fresher B.Ed. students

8.5 Selection of Research Tools

The present investigation is primarily an exploration of attitudes. Thus Opinionnaire presented through statements is judiciously selected as a convenient research tools for gathering the opinions at four different dimensions of the B.Ed. syllabus.

8.6 Constructions of Opinionnaire

Opinionnaire, the present research tools in the study was designed after the investigator had made extensive search of relevant related literatures. To study the attitude of the female teacher trainees towards the B.Ed. curriculum the opinionnaire was constructed on the basis of the following four dimensions.

- ❖ Core courses of the B.Ed. curriculum
- ❖ Method courses of the B.Ed. course
- ❖ Practice Teaching
- ❖ Field-based/Practicum Activities

The opinionnaire comprising 30 statements divided under four levels. In the first dimension, namely, 'Core courses there are 11 positive statements and 7 negative statements, taken together there are 18 statements.

In the second dimension, namely, 'Method courses there are 5 statements among which 2 are negative and 3 are positive.

In the third dimension, namely, 'Practice Teaching' there are 3 statements among which 3 are positive and 4 are negative.

In the fourth dimension, namely, 'Field-based/Practicum Activities there are 4 statements among which 2 are positive and 2 are negative.

8.7 Attitude Scale

In the present investigation 3-point Likert- type of scaling technique is adopted. In this type three responses – "Agree", "Partially Agree" and "Disagree"– are used for necessary analysis. These are indicated as under:

Response	Scale Value
Agree	3
Partially Agree	2
Disagree	1

8.8 Scoring Technique

On the basis of 3-2-1 scale value the scores of individual response sheets are calculated. Inferential Statistics namely, T-test was applied to the raw-scores to measure the level of attitudinal difference between the various categories of teacher-trainees.

8.9 Standardization of Tools

The tools, i.e. the opinionnaire are standardized using the criteria of reliability, validity and uni-dimensionality. Before administration of the tools to the stipulated no of teacher trainees a pilot study was conducted by the investigation to check the relevance and utility of the statements included in the opinionnaire. After necessary pruning and elimination of the redundant statements the standardized opinionnaire was prepared, and verified thoroughly. The opinionnaire comprise 36 standardized statements.

9. COLLECTION OF DATA

The final opinionnaire was administered 150 teacher trainees of different self-financing teacher training institutions. The investigator collected the data from the selected teacher training institutions personally and introduced himself with the teacher trainees and distributed the opinionnaire among them. After giving necessary instruction the investigator requested them to provide unbiased responses to the space provide against each statement. The answer sheets were collected after completion of answer by the teachers.

10. ANALYSIS & INTERPRETATION

In the present study the analysis of data collected through the opinionnaire to explore the attitude of the teacher trainees towards the B.Ed. curriculum is done. Keeping parity and consistency with the hypotheses the raw scores were grouped under four different levels for the purpose of analysis. T-test was done on the scores of two independent variables of each level. The significance of the T-value of eight different pairs was thoroughly judged for critically analyzing the level of acceptance or rejection of the hypotheses. The findings of the data through the application of inferential statistics and their corresponding interpretations are presented as under.

11. INTERPRETATION OF THE RESULTS

Analysis of Hypothesis 1

Table-4: Paired T for Male-Female

Variables	Sample Size	Mean	St. Dev	SE. Mean	Calculated T-Value
Male	75	81.94	5.45	0.63	0.44
Female	75	82.37	5.38	0.58	
Difference	75	0.47	7.37	0.89	

Interpretation: The calculated T value of table 4 is 0.44. The value of T for df 148 at 0.05 level is 1.98. Thus the obtained T value is less than the statistical table value of T. So the obtained T value is **not significant**. Thus the null hypothesis is accepted and the original research hypothesis is rejected. Therefore we may conclude that there lies no significant difference in attitudes among the Male and Female B.Ed. students towards the NCTE B.Ed. curriculum of the Burdwan University.

Analysis of Hypothesis 2

Table-2: Paired T for Fresher-Male/Fresher- Female

Variables	Sample Size	Mean	St. Dev	SE. Mean	Calculated T-Value
Fr/male	38	81.73	4.19	0.68	2.5
Fr/female	38	78.98	5.65	0.90	
Difference	38	2.64	5.69	0.92	

Interpretation: The above table shows the obtained T value to be 2.5. The calculated T value is significant since it is greater than the statistical table value of T i.e. 2.00 for df 74 at 0.05 level. Therefore it can be safely stated that there lies **significant** attitudinal difference between the *Fresher Male, B.Ed. students and Fresher Female B.Ed. students* towards the present B.Ed. curriculum of the Burdwan University. Accordingly it can be stated that the null hypothesis is rejected and the research hypothesis is retained.

Analysis of Hypothesis 3**Table-3: Paired T for Deputed Male/ Deputed Female.**

Variables	Sample Size	Mean	St. Dev	SE. Mean	Calculated T-Value
Deputed Male	38	77.85	5.45	0.64	0.15
Deputed Female	38	77.87	5.09	0.57	
Difference	38	00.17	7.31	0.85	

Interpretation: From the table we get the calculated T value to be 0.15. The statistical table values of T for df 74 at 0.05 level is 2.00. Thus the obtained T value is much less than the statistical table value of T. So the present T value is **not significant**. Accordingly we can say that the original hypothesis is rejected and the null hypothesis is accepted. Therefore, we can conclude that there is no significant attitudinal difference among the *Deputed Male B.Ed. students* and the *Deputed Female B.Ed. students* towards the existing B.Ed. curriculum of the Burdwan University.

Analysis of Hypothesis 4**Table-4: Paired T for Deputed-Fresher**

Variables	Sample Size	Mean	St. Dev	SE. Mean	Calculated T-Value
Deputed	75	82.84	5.42	0.62	0.46
Fresher	75	82.17	5.35	0.57	
Difference	75	0.46	7.34	0.88	

Interpretation: The calculated T value of table 4 is 0.46. The value of T for df 148 at 0.05 level is 1.98. Thus the obtained T value is less than the statistical table value of T. So the obtained T value is **not significant**. Thus the null hypothesis is accepted and the original research hypothesis is rejected. Therefore we may conclude that there lies no significant difference in attitudes among the *Deputed and Fresher B.Ed. students* towards the NCTE B.Ed. curriculum of the Burdwan University.

12. CONCLUSION

The present study was undertaken by the investigator to measure the level of difference in attitude among various categories of teacher-trainees of the self-financing B.Ed. students towards the present B.Ed. curriculum of the University of Burdwan. After extension survey work the obtained data was systematically categorized under various heads. To know the attitudinal difference between two mutually contrary groups of B.Ed. trainees, a quantitative measuring drive was adopted on the basis of 3-2-1 Likert type of Attitude Scale. The attitudinal difference was then measured by administering inferential statistics on the raw scores of the various types B.Ed. students.

After determining the level of significance it was found that significant attitudinal difference exists only in case of this pair of secondary teacher-trainees viz. *Fresher male and Fresher Female B.Ed. students*. Accordingly null hypothesis (2) is rejected and research hypothesis is retained. The hypothesis (1), hypothesis (3), and hypothesis (4), which anticipated that there would exist significant attitudinal difference among the various categories of B.Ed. students as mentioned in respective hypotheses, were rejected and in these cases the null hypotheses are accepted.

The investigators study was a rigorous initiative and was conducted consistently keeping in mind the untiring effort associated with purpose of research work.

13. DELIMITATION OF THE STUDY

The delimitations of the present study are as follows:-

- The study was limited to two districts namely, Birbhum and Purbanchal only.
- The investigator took into account the responses of the B.Ed. teacher trainees only. Teacher trainees belonging to M.Ed. or D.Ed. categories were kept outside the purview of the present study.
- Only Independent variables were taken into consideration.
- The number of samples was restricted to 150 only.

14. FURTHER STUDY

- The work can be administered on M.Ed. and D.Ed. teacher trainees only.
- An analytical study may be taken for separate microanalysis of each dimension of the curriculum in details.
- The study conducted by increasing the sample and including more districts in the territory of West Bengal.

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YOGA AS AN IMPORTANT ASPECT FOR SPIRITUAL INTELLIGENCE

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ABSTRACT

Yoga is a group of physical, mental and spiritual practice. Yoga can relieve pain and help people with arthritis, back pain, mental health and other chronic conditions. Not only does yoga keep a person fit, but it is also have many long-term benefits. Yoga is an integral part of the way of life. Yoga is a complementary cure for several diseases and disorders such as schizophrenia, asthma, heart diseases and cancer. Yoga may reduce risk factors and help in a patient's psychological healing process. Yoga has a significant and positive impact on spiritual intelligence. Yoga contributes not only to mental health, but also spiritual growth, spiritual practice and spiritual intelligence. The inner part of mind and spirit is concerned with spiritual intelligence. Spiritual intelligence may emerge as a conscious involvement in a conscious awareness of matter, life, body, mind, soul and spirit. Spiritual intelligence is more than individual mental ability. It appears to connect the personal to the transpersonal and the self to spirit. Spiritual intelligence moves beyond conventional psychological development. Yoga and spiritual intelligence have theoretical and conceptual harmony with each other. Yoga influenced internal thoughts which increase the spiritual intelligence in individuals. Yoga brings a person close to his spiritual aspect. Yoga as a self-help system for the spiritual and psychological development of an individual. Yoga improves the self-awareness of the individual through mental control.

Keywords: Yoga, Sahasrara (seventh chakra), Ha-ha yoga and spiritual intelligence.

INTRODUCTION

Yoga is a collection of physical, mental and spiritual practices. Yoga is a discipline originating in ancient India. The Rig-Veda mentioned the origins of yoga as a backdrop to pre-Vedic Indian traditions. But most developed in ancient Indian Ascetic and Ramona movements in the fifth and sixth centuries BC. The chronology of earliest texts described yoga practices is unclear, credited to Hindu Upanishads. Yoga Guru's from India later introduced yoga to the west, the success of Swami Vivekananda in the late 19th and early 20th century. In 1980's, yoga became popular as a system of physical exercise across the Western world. Indian yoga is more than physical exercise; it has a spiritual and meditative core.

Yoga's effectiveness complements cancer, heart disease, schizophrenia and asthma. Yoga can reduce risk factors and help in the psychological cure process of a patient. On 1st December 2016 UNESCO listed Yoga as an intangible cultural heritage. Yoga not only enhances physical strength but also contributes largely towards the mental health and spiritual growth of a person. In view of the growing popularity of yoga, our Prime Minister Narendra Modi suggested at the UN Assembly that yoga should be given a special day as it is beneficial to everyone and would help to raise awareness of its benefits by making it a world event. So, for the first time in the world, on 21 June 2015, World Yoga Day was celebrated annually.

Yoga is a practice in which the body, mind and spirit are integrated. Yoga asana can relieve symptoms of osteoarthritis, carpal tunnel syndrome and pain in the back. Yoga is used to treat essential hypertension, migraine, peptic ulcer, chronic sinusitis, pain, anxiety, gastritis, bronchial asthma and headache.

Many researchers have found that yoga is effective in alleviating stress and anxiety that affects many physical and mental health conditions. Yoga exercise involving postures, breathing and meditation helps practitioners gain physical strength and flexibility and calm their minds. Yoga keeps a person fit and have many long-term advantages when it is an integral part of the lifestyle. Some advantages of yoga are listed below

- 1. Improves bone health:** Yoga improves people's bone health. Many yoga postures require that we lift our weight, which helps to strengthen the bones and prevent osteoporosis.
- 2. Better posture:** Yoga helps to keep the spine upright, allowing a person to sit straight and not slouch. It also helps to mitigate the stress caused by incorrect posture on the spine. Consistent yoga practice helps keep the spine strong and prevents fatigue.
- 3. Improves heart health:** When you practice yoga regularly, your heart gets into the aerobic range. This reduces the risk of heart attack and also alleviates depression. Yoga improves your heart's health.

3. Increases blood flow: The inverted and twisted nature of yoga causes the venous blood to flow out of the internal organs. This also increases the number of haemoglobin and red blood cells. Yoga helps to increase the flow of blood.

5. Improve balance: - Yoga not only focuses on maintaining postures for longer period of time, it also helps to improve body balance and develop muscle tone.

6. Maintain blood pressure: - Savasana (corpse pose) helps people suffering from high blood pressure. This pose is said to have led to significant improvements in people with problems with high blood pressure. Yoga helps to maintain people's blood pressure.

7. Improves lung health: - Yoga not only draws a person's attention to the breathing pattern, but also acknowledges the correct breathing that filters the air, warms it and humidifies it by removing pollen and dirt and providing fresh oxygen to the lungs. Yoga improves people's lung health.

8. Helps in sleeping disorders: - Yoga helps to relieve modern life's stress and helps in sleeping problems; it relaxes a human body and mind and helps a person to sleep peacefully and deed fully. Yoga encourages a person to breathe and concentrate on the present. It shifts a person's focus from a nervous system of sympathy to a parasympathic nervous system. Restorative asana and meditation also encourages a turning inward of the senses, which relaxes the nervous system.

9. Eases pain: Yoga can relieve pain and help people with arthritis, pain in the back and other chronic problems. When there is pain, the person is in a much better mood and tends to be more active.

9. Reduce digestive problems: - Yoga can ease constipation and reduce the risk of colon cancer like any other physical exercise. Yoga involves movements that help improve food transport and eliminate waste through the intestines. This helps to eliminate the system's waste more efficiently.

Yoga not only has the above benefits, but it has largely contributed to mental health, spiritual growth, spiritual practice and spiritual intelligence. Let's see what spiritual understanding is.

SPIRITUAL INTELLIGENCE

Danah Zohar used the term "spiritual intelligence" and introduced the idea in 1997. Ken O'Donnell, an Australian author and consultant living in Brazil, also introduced the term "spiritual intelligence" in his book End quality -the emotional and spiritual dimensions of the human being in organizations in 1997. In his theory of 'multiple intelligences,' Gardner first proposed the concept of spiritual intelligence in 1998. Individual spirituality helps people to develop their ability to make decisions and achieve their goals. Spiritual intelligence is the combination of the term "spirituality" and "intelligence," and it represents the spontaneous guidance of the concepts' originality and holistic approach. Individual spirituality influences the empirically confirmed performance of employees (Osman-Gani, Hashim & Ismail 2013). Spiritual intelligence is defined as the ability to use spiritual qualities to improve daily work and well-being. Spiritual intelligence suggests that this intelligence is one of several types and can be developed independently. Spiritual intelligence requires multiple ways of knowing and integrating the inner life of mind and spirit into the world's outer life of work. It can be cultivated by questing, investigating and practicing. Depending on the context and means of integration, spiritual experiences can also contribute to its development.

Spiritual intelligence is defined as "an individual's ability to have a socially relevant purpose in life by understanding himself and a high level of awareness, compassion and commitment to human values "(Vineeth V. Kumar and Manju Mehta). Spiritual intelligence is concerned with spirit, mind's inner life and its relationship with the world. Spiritual intelligence is an ability to understand existential issues in depth and to understand multiple levels of consciousness. Spiritual intelligence appears as an ever-deepening awareness of matter, life, body, mind, soul and spirit. It's more than a mental ability. The personal with the transpersonal and the self with the spirit seem to be connected. Spiritual intelligence goes beyond the development of conventional psychology. In addition to self-awareness, we are aware of our relationship with the transcendent, with each other, with the earth and with all beings.

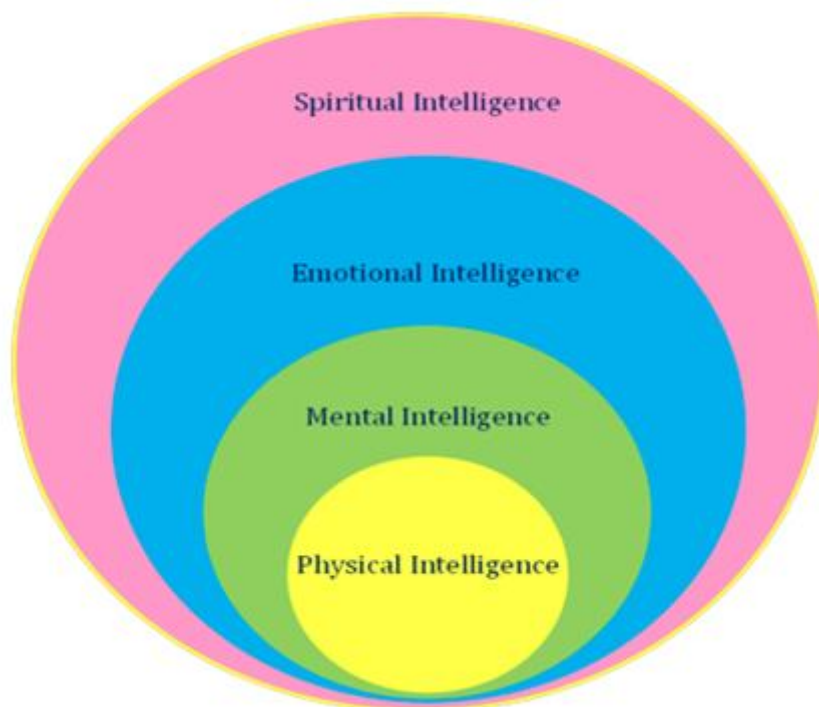
Spiritual intelligence is the most important type of intelligence in people, societies and cultures because of its ability to influence change. Spiritual intelligence helps people to achieve a positive outlook and inner peace. This change in attitude improves self-motivation and control and helps reduce the high levels of stress commonly caused by modern life's hectic pace.

Spiritual intelligence not only brings out self-awareness but also develops various qualities such as spontaneity, holism, compassion and humanity. It teaches us to live a life based on values and principles. It develops critical thinking and a spirit of scepticism that incites us to ask questions.

In addition, spiritual intelligence also develops tolerance, which means that other people are valued for their differences and not despite them. In other words, we can say it calls on us to celebrate diversity.

It develops a sense of people's vocation, a sense of contributing something, giving something back to the society, being positive in the face of adversity and learning from our own mistakes and helping us grow. Therefore, spiritual intelligence develops a sense of service, encourages reason and logic and leads a more positive outlook on life.

Spiritual intelligence not only includes individual mental ability, but also seems to connect the personal with the transpersonal and the self with the spirit. Spiritual intelligence goes beyond the development of conventional psychology. In addition to self-awareness, it implies awareness of the relationship between persons and the transcendent, the earth and all beings.



<https://www.ncbi.nlm.nih.gov/pubmed/24118522>

Spiritual intelligence encompasses all other intelligences, in other words. Intelligence emotional, mental and physical. All kinds of intelligence are, therefore, but part or part of spiritual intelligence. Let us see how yoga is an effective spiritual intelligence tool.

YOGA AS AN IMPORTANT ASPECT SPIRITUAL INTELLIGENCE

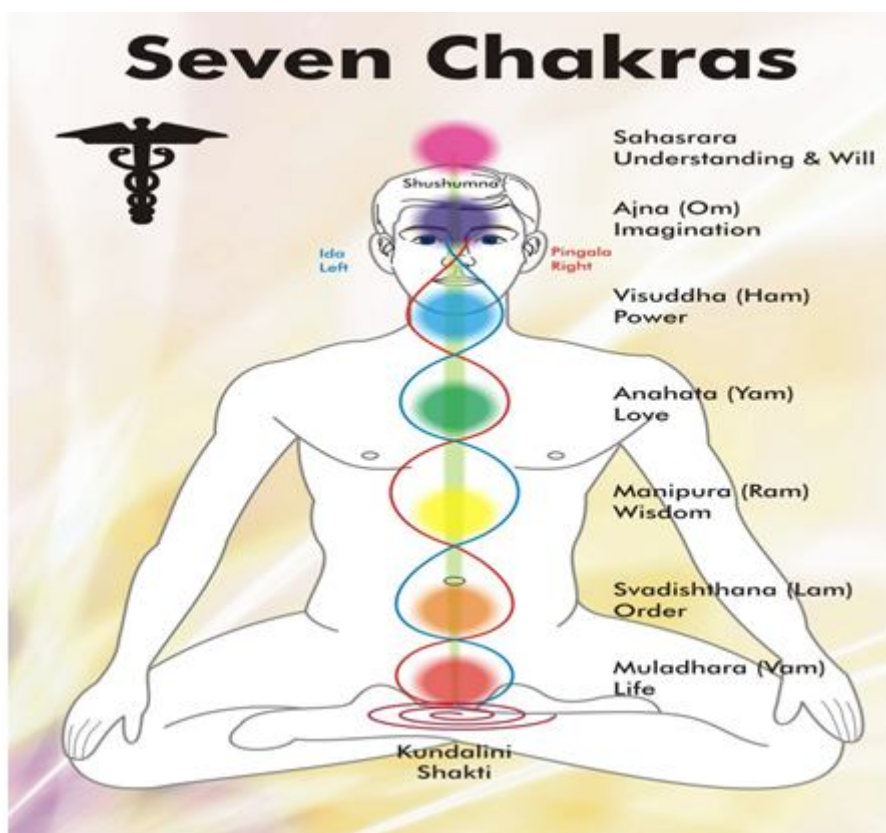
Yoga increases thoughts that provide the basis for feeling understanding. Yoga as an individual self-help system effective for mental and spiritual progress so that physical exercises and breathing can contribute to the spiritual improvement and development of knowledge by yoga instructions that include ethical and spiritual standards of life.

Transcendental awareness is an important aspect of spiritual intelligence and yoga has a great impact on it. Yoga provides the basis for transcendental awareness in individuals by establishing more and deeper meditations (Mousavinasab, 2008). Yoga exercises have an effect on strengthening certain features such as enhancing accuracy and concentration as explanatory factors for awareness expansion (Khalsa, 2004). Yoga and spiritual intelligence have theoretical and conceptual closeness and yoga causes internal thought that increases individual spiritual intelligence.

Those who practice yoga are said to experience yoga only when they work in union with God. People who do yoga following all Patanjali's eight fold paths are told to get closer to their spiritual aspect. In this respect, we can say that yoga is an individual system of self-help that is effective in spiritual and psychological development. Yoga exercises are believed to be effective in self-awareness, one of the components of spiritual intelligence.

Yoga in the component of critical existential thinking has a significant and positive impact on spiritual intelligence. King said in 2007 that critical existential thinking indicates the profound thinking of an individual

towards the world, the concept of life events and thinking in the nature of realities. Medication, chakra affects thyroid and parathyroid glands, and its associated field is the belief and inspiration that its output can be seen to improve critical and existential thinking. The sixth chakra of Ajna can also explain this effect. In yoga, the sixth chakra is called the eye of wisdom or the eye of knowledge that is known to be related to understanding and enlightenment and is affected by the stimulation of the hypothalamus (pituitary) gland of the individual. Yoga is also an effective factor in strengthening beliefs in the Creator with the power to stimulate thought and peace, which has been stated in spiritual intelligence in terms of meaning as equal to the production of personal meaning. The application of yoga exercises increases self-attention and realizes that higher meaning production is one of the aspects of spiritual intelligence by creating in-depth thinking in life affairs. Some brain activities influenced by yoga can explain the possible effect of yoga on the transcendental awareness of spiritual intelligence (Ameram & Dryer, 2007). Hatha yoga is coordination between the physical body, pranic body and mental body systems, the most important of which is the spiritual transmission channel awakening. The Kundalini power transmission from the root chakra (the first chakra) to the seventh chakra (Sahasrara) is a factor along the spine.



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Yoga provides the basis for the appearance of transcendental consciousness in spiritual intelligence the more and more profound care in the individual. The result of daily practice and the promotion of care and attention strengthen the relationship between mind and body and not only increase body knowledge after a while, but also strengthen the focus of mind. In these circumstances, any part of the body you focus on attracts your mind to reduce the possibility of inserting other thoughts (Mahdavi-pour Fard, 2007). Those who coordinate their body movements with breathing during their daily exercises actually train mind and body awareness, coordination and being in the present moment to all brain units and body cells that are typically the same attentiveness. It has been explained in this regard that yoga causes the mind to be controlled and that human beings reach a higher consciousness (Mousavinasab, 2008). Yoga exercises improve the self-awareness of the individual through mental control, humility and pardon, as well as believing in God (especially in stressful and anxious emergency situations leads to higher relaxation and concentration.

CONCLUSION

On the basis of the different studies we have discussed, we can conclude that yoga is essential for a healthy body and a healthy life. Yoga not only maintains physical, mental and spiritual growth, it also facilitates pain, helps people with back pain, arthritis and other disorders. It has become an integral part of our life style. Yoga is a complementary influence for curing diseases like schizophrenia, heart diseases, cancer and asthma. Yoga

has a positive impact and is most significant for spiritual intelligence. Yoga contributes towards mental abilities, mental hygiene, mental health, spiritual growth, spiritual practice and spiritual intelligence. spiritual intelligence is concerned with spirit, inner life of mind is more than an individual mental ability. It connects the personal to the interpersonal and the self to spirit. Spiritual intelligence and yoga has conceptual, theoretical and practical harmony with each other. Yoga not only influence for internal thoughts which increase the spiritual intelligence of individuals but it also help in making a person close to spiritual aspects. Yoga is a self assistance system which is effective for spiritual and psychological development of human beings. Yoga improves self consciousness, mental health, spiritual growth and spiritual intelligence of human beings.

SUGGESTIONS

1. Yoga work as an effective tool for the development and argumentation of spiritual intelligence.
2. Yoga practiced at workplace brings out ones spiritual intelligence for the development of healthier and happier environment.
3. High spiritual intelligence attain due to regular practice of yoga, will help an individual in relaxing in his stressful life.
4. Yoga provides the ground for appearance in transcendental consciousness, by talking more and deeper care of individual.
5. Daily practice of yoga helps in improving the body mind relationship, thus making their relationship spiritually stronger.
6. Yoga manifests its effect with devotion, inspiration, selflessness and spiritual understanding.

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A STUDY OF SOCIO-CULTURAL ENTITY AT A DEFINITE HISTORICAL STAGE OF TRIBAL GROUPS DEVELOPMENT IN ANDHRA PRADESH: A CASE STUDY OF ANDHRA PRADESH

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ABSTRACT

In the wake of the scientific advancement of exponential magnitude that humankind has achieved during the past 150 odd years in comparison with what our forbearers did theretofore since the symphony of creation had closed full in man, the wide world we live in has been reduced, as it were, to a sprawling village sans frontiers. Objectives of the Study to examine the socio-economic profile of tribals in India with special reference to Kurnool district of Andhra Pradesh. To assess the awareness among the tribals with regard to developmental programs and their participation in these programs in the study area. The creation of an egalitarian social order with equity for all sections of the society, free from any form of discrimination on grounds of religion, race, sex or place of birth is the cherished goal of our nation enshrined in the constitution. Equity for the weaker sections of the society, therefore, is the moving spirit of the constitutional schema and permeates the same. The founding fathers of our constitution desired to secure justice, social, economic, and political for all citizens. They realized that the inequitable forces embedded in the socio-economic system and also political organizations, had resulted in deprivation and disadvantages for the poor and the weaker sections of the society. They, therefore, considered it necessary to provide specific safeguards in the constitution for the Scheduled Castes and Scheduled Tribes, who, due to tradition and a combination of circumstances, were the most deprived, weak and vulnerable amongst the various sections of the society.

Keywords: Socio-Cultural, Entity, Exponential, weaker Sections, Discrimination.

INTRODUCTION

India is the home to large number of indigenous people, who are still untouched by the lifestyle of the modern world. With more than 84.4 million, India has the largest population of the tribal people in the world. These tribal people also known as the adivasi's are the poorest in the countries, who are still dependent on hunting, agriculture and fishing. Some of the major tribal groups in India include Gonds, Santhals, Khasis, Angamis, Bhils, Bhutias and Great Andamanese. All these tribal people have their own culture, tradition, language and lifestyle. The principle of social justice demands that the marginalized sections of the people be given protection and preferential treatment for furthering their progress and development. The tribals of India constitute one such group who must be supported and protected by the government. As a result of the peculiarity of the Indian social structure, they have been exploited, discriminated against, and ostracized - socially, economically and politically- from as far back as the Vedic times.

In the wake of the scientific advancement of exponential magnitude that humankind has achieved during the past 150 odd years in comparison with what our forbearers did theretofore since the symphony of creation had closed full in man, the wide world we live in has been reduced, as it were, to a sprawling village sans frontiers. The hallmarks of this world are efficiency, productivity, technique, integration and prosperity. People belonging to different nations are engaged in a fierce struggle to attain socio-economic progress. But the absence of a level playing ground makes this struggle highly iniquitous and excludes the underprivileged sections of the society from taking advantage of the new blessings and choices of the fast moving world order. The creation of an egalitarian social order with equity for all sections of the society, free from any form of discrimination on grounds of religion, race, sex or place of birth is the cherished goal of our nation enshrined in the constitution. Equity for the weaker sections of the society, therefore, is the moving spirit of the constitutional schema and permeates the same.

The founding fathers of our constitution desired to secure justice, social, economic, and political for all citizens. They realized that the inequitable forces embedded in the socio-economic system and also political organizations, had resulted in deprivation and disadvantages for the poor and the weaker sections of the society. They, therefore, considered it necessary to provide specific safeguards in the constitution for the Scheduled Castes and Scheduled Tribes, who, due to tradition and a combination of circumstances, were the most deprived, weak and vulnerable amongst the various sections of the society. The various safeguards and protective measures sought to ensure for them all round development and freedom from exploitation and social injustice so that they could form part of the mainstream of the society.

Article 46 of the Constitution of India provides that “the state shall promote with special care the educational and economic interests of the weaker sections of the people, and in particular of the Scheduled Castes and Scheduled Tribes and shall protect them from social injustice and all forms of exploitation”. Thus the Constitution of India gives due recognition to the problems and aspirations of the tribals. The policy of reservation forms the central part of the social justice dispensation of the constitution. Reservation is meant to compensate for the unprecedented discrimination perpetrated against them from antiquity thereby empowering and integrating them with the mainstream society. The global initiative of placing people at the centre of development can proceed with added force through the empowerment of the peripheral socio-economic groups, especially the tribals.

The Scheduled Tribes particularly the primitive tribes are placed in the most disadvantageous position in modern India. The backwardness of the tribe is attributed largely to their long isolation from the general society and their exploitation by the non-tribes. Tribals who have contributed to the richness of our culture and heritage have been neglected and isolated particularly during 19th and early 20th centuries. India started her large scale planned development planning in 1951. This development planning derives its objectives and social premises from the ‘Directive Principles of the State Policy’ set forth in the Constitution of India. The objectives of our development plans are to initiate a process of all round balanced development which would ensure a rising national income and steady improvement in the living standards. Ironically the backlash of these efforts resulted in the suffering of some tribals in the form of displacement and prompted the evolution of planned efforts for tribal development and suitable policies for the protection of their rights. These efforts have initiated the process of social transformation among them. Therefore in the present study an attempt is made to profile the changes in social and economic life in the context of a Primitive Tribe namely Chenchus, who are mostly spread in Kurnool district of Andhra Pradesh.

OBJECTIVES OF THE STUDY

1. To examine the socio-economic profile of tribals in India with special reference to Kurnool district of Andhra Pradesh.
2. To assess the awareness among the tribals with regard to developmental programs and their participation in these programs in the study area
3. To analyse the impact of developmental programs on the socio-economic conditions of tribals.
4. To assess the perceived effectiveness of developmental programs in bringing out transformation in social aspects and adoption of modern methods.
5. To suggest necessary measures in the light of the findings of the study for the effective implementation of developmental programs aiming to improve the socio-economic conditions of tribals.

REVIEW OF LITERATURE

Krishna Iyer (1985) defines "tribe is a social group of simple and kind, the members of which speak a common dialect, have a single government act together for common purposes and have a common name, a contiguous territory, a relatively uniform culture or way of life and a traditions of common descent."

Bardhan (1973) defines the tribe as "course of socio-cultural entity at a definite historical stage of development. It is a single, endogamous community with a cultural and psychological makeup".

According to Majumdar (1961) the tribe is "a collection of families or common group bearing a common name, the members of which occupy the same territory, speak the same language and observe certain taboos, regarding marriage, professions and have developed a well assured system of reciprocity and mutuality of obligations."

Kamala Devi Chatopathayaya (1978) defines "a tribe ordinarily has an ancestor or a patron deity. The families or groups composing the larger units are linked through religions and socioeconomic functions.". The term 'tribe' has not been defined clearly anywhere in the Indian constitution. Only the term 'Scheduled Tribe' explained as "the tribe or the tribal communities or parts of or group within tribes or tribal communities". These groups are presumed to form the oldest ethnological sector of the people (Constitution of India, Article.342).

RESEARCH METHODOLOGY

Out of 427 Identified Tribal Communities in India, 33 Tribal groups, who are at different stages of socio-economic development, are living in Andhra Pradesh state. Of the 33 Scheduled Tribes of Andhra Pradesh, 8 tribal groups have been recognized as Primitive Tribal Group (PTG) by the Govt. of India. These 8 tribes (Chenchus, Kolam, Kondareddy, Kondasavaras, Gadabas, Gonds, Porjas and Thotis) are extremely backward

tribal groups who are identified as Primitive Tribal Groups because they are at the pre-agricultural stage of economy characterized by low level of literacy and who largely depend on food gathering for their subsistence. The constitutional machinery had designed various programs and policies that aim at the welfare and social security of these indigenous tribal people in the country. Yet the process of total empowerment of tribal people did not reached the zenith and there have been mixed experiences of effectiveness in the form of quality and standard of these tribal people.

SCOPE OF THE STUDY

The present study is multi fold in its nature as it aims to study the socio-economic background of the tribal respondents belonging to chenchu tribe of Kurnool district and it assess the impact of developmental programs on the quality of life of tribal people and the study further analyses the perceived effectiveness of tribal developmental programs that have been implemented. The study further explores the existing gap that prevails in the perceived and expected effectiveness of the developmental programs. Thus the study has wider contour to experiment within the defined perimeters.

DATA ANALYSIS

The district wise population of scheduled tribes of Andhra Pradesh by the officials information followed by below

Table-1: District Wise Population of Scheduled Tribes of A.P. 2011 census

Sl. No	Name of the District	Total Population	ST Total	ST Male	ST Female	% of Male (ST) Total Population	% of Female (ST) Total Population	% of ST Total Population
1	Srikakulam	2703114	166118	81382	84736	3.01	3.13	6.15
2	Vizianagaram	2344474	235556	114687	120869	4.89	5.16	10.05
3	Visakhapatnam	4290589	618500	302905	315595	7.06	7.36	14.42
4	East Godavari	5285824	297044	144548	152496	2.73	2.88	5.62
5	West Godavari	3994410	133997	65439	68558	1.64	1.72	3.35
6	Krishna	4517398	132464	66734	65730	1.48	1.46	2.93
7	Guntur	4887813	247089	125105	121984	2.56	2.50	5.06
8	Prakasam	3397448	151145	76677	74468	2.26	2.19	4.45
9	SPSR Nellore	2963557	285997	145168	140829	4.90	4.75	9.65
10	YSR Kadapa	2882469	75886	38571	37315	1.34	1.29	2.63
11	Kurnool	4053463	82831	42052	40779	1.04	1.01	2.04
12	Anantapur	4081148	154127	78573	75554	1.93	1.85	3.78
13	Chittoor	4174064	159165	79756	79409	1.91	1.90	3.81
ANDHRA PRADESH		49575771	2739919	1361597	1378322	2.75	2.78	5.53

Source: Census of India, 2011

* Data includes ST population of Submergence of Sch.villages of 7 mandals from Khammam district to the A.P. State (as per re-organisation act 2014)

Note:- As per Andhra Pradesh Reorganisation Ordinance 2014, 7 Mandals(5 Complete & 2 Partial) of Khammam District are removed from Telangana State and tentatively added to Andhra Pradesh State.

Study deals with the age of the respondents in the study area. It shows that majority of the respondents (58%) are in the age group of 36- 45 years followed by the age group of 46-55 years with 14%, the persons in the age group of 18-25 comprising 13.3%. Only 9.3% of the respondents are in the age group of 18-25 years and 5.4% of the respondents in the age group of above 50 years. It shows that majority of the respondents are at the matured level in their age and the constitute an effective human resource to the society wherein their empowerment certainly leads to better emancipation of the rural society.

Table-2: Literacy rate of Total and Scheduled Tribes Population and Gap in Literacy rate: 1991-2011
(Figures in percentage)

India/ State	Literacy Rate - 1991		Gap in Literacy Rate	Literacy Rate - 2001		Gap in Literacy Rate	Literacy Rate - 2011		Gap in Literacy Rate
	Total	ST		Total	ST		Total	ST	
INDIA	52.2	29.6	22.6	64.8	47.1	17.7	73	59	14
AP (Combined)	44.1	17.2	26.9	60.5	37	23.4	67	49.2	17.8
Andhra Pradesh	-	-	-	-	-	-	67.4	48.8	18.6
Telangana	-	-	-	-	-	-	66.5	49.5	17.0

Source: Statistical Profile of Schedule Tribes in India 2016

Study deals with the literacy levels of the respondents in the select study area. It shows that majority of the respondents (71.6%) are illiterates and 23.4% of the respondents are having primary level of education and only 5% are having secondary level of education. It is interesting to note that there are no graduates, post graduates and persons with higher education levels. It is an alarming observation that the literacy levels in the tribal areas are very low and hence steps are to be taken in this direction to accelerate the literacy levels in the tribal areas.

Table-3: State wise Literacy Rates of Scheduled Tribes (Census 2011)

State	Total			Rural			Urban		
	Person	Male	Female	Person	Male	Female	Person	Male	Female
AP (Combined)	49.2	58.3	40.1	46.9	56.1	37.7	66.8	74.7	58.7
Telangana	49.5	59.5	39.4	47.1	57.2	36.9	69.9	78.1	60.8
Andhra Pradesh	48.8	56.9	40.9	46.6	54.7	38.6	64	71.3	56.6

Source: Statistical Profile of Schedule Tribes in India 2016

Tables show the occupation patters of the respondents in the select study area. It shows that majority of the respondents (61.4%) are practicing Non-agricultural activities, 27.6% of the respondents with agricultural activities and 8% of the respondents resorting to wage labour/ employment. The table further shows that 3% of the total respondents are practicing other forms of occupational platforms. In order to survive with their livelihood.

Table-4: Sources of Annual Income of the Respondents (in Rs.)

S. No	Source of Income Particulars	Total	Percentage (%)
1	Agriculture	82	27.3
2	Agricultural wages	25	8.3
3	Non- Agricultural wages	36	12
4	Animal Husbandry	24	8
5	Income from Govt. Employment Generation schemes/ Development programs	28	9.4
6	Artisan Works	6	2
7	Cottage industry	0	0
8	Forest products	87	29
9	Other sources	12	4
	Total	300	100

Source: Primary Data

It is observed from the above table that, though the tribals inhabit in and around the forests where they are easily accessible to the land, they are reluctant to practice agricultural activities. They are engaged in other Non-agricultural activities like collection of timber for fuel, collection of Minor Forest Produce (MFP) like honey, tamarind and tend leaf and other products. Thus majority of the respondents are not following fixed pattern of occupation for the generation of income. It is also interesting to note that many respondents are turning to wage labour and employment.

FINDINGS & CONCLUSIONS

Study had dealt with the data analysis pertaining to demographic profile, socio-economic status and other identified variables in order to measure the impact of development programs. This chapter is presented in 2 parts namely Part-A and Part-B. Part A deals with the demographic profile of the respondents involving age, literacy level, occupation, land possession, annual income, marital status, no. of children, type of family,

housing particulars, house ownership status, no. of living rooms, electrification facilities to the households, drinking water sources, furnishing possessed, sanitary facilities, drainage facilities, length of the stay, monthly income level, household assets, livestock particulars, cropping patterns, sources of annual income, expenditure patterns, sources of debt. And savings/ investment particulars of the beneficiaries. Part-B deals with the impact of development program on various identified dimensions with relevance to the development of beneficiaries and the increased levels of self-development, social status, economic status and political status of the beneficiaries. In order to test the impact of development programs on the living status of the beneficiaries, statistical tests were conducted on the proposed hypotheses (H_{01} to H_{04}) and the null-hypotheses framed for the purpose were rejected. This chapter summarizes that there is an impact of development programs on the living conditions of scheduled tribes in the select study area.

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CORPORATE GOVERNANCE AND EQUAL TREATMENT: A DEMOGRAPHIC ANALYSIS OF MINORITY SHAREHOLDERS

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ABSTRACT

Need of equal treatment between all the shareholder's originates from the fundamental principle of corporate governance called fairness. Fairness here means the rules and regulation would be same for all. The present paper aims to study the expectations of shareholders regarding their equal treatment with respect to different demographic characteristics including gender, age, profession and investment experience. The responses of 495 respondents were included in the study. The main statistical techniques used for subjecting the primary data include frequency distribution, mean, SD, and f test. It was found that difference across responses appears mainly due to different professions of respondents.

INTRODUCTION

Corporate governance is a system which ensures fairness for all the stakeholders in the boundaries of organization in their absence in spite of their magnitude. Fairness is among the fundamental principles of corporate governance. Fairness means equal treatment for all the stakeholders. It also ensures that rules, regulations and rights should be applied in the same manner for minority as well as majority shareholders so that rights of minority shareholders can be protected in all circumstances.

REVIEW OF LITERATURE

For several years, researchers in the field of corporate governance studied its various aspects. Based on the different legal structures and cultural settings adopted by different nations, the governance practices are not uniform across nations; thus, corporate governance problems do not end up by imitating best practices of some other country. Instead, they should concentrate efforts to understand their internal strengths; to have a relationship based governance processes, state-led economies or market-centric models and to develop a governance model unique to their needs, which would certainly shore up their corporate governance practices. Although, convergence has addressed as the biggest challenge to corporate governance in the context of globalization of practices because of the existence of divergent legal and political systems prevailing in different countries [Bhasa, 2004].

Petra examined the actual governance structures of Enron, WorldCom, and Global Crossing during the years of their accounting scandals compared to the new requirements and he found that Global Crossing's governance structure would have satisfied a majority of the reforms and Enron's and WorldCom's governance structure would have satisfied less than half of the reforms. He suggested that management and shareholders should alike need to focus on the substance of reforms and not merely the form in order to make meaningful improvements to corporate governance [Petra, 2006]. Sound corporate governance is highly correlated with better operating performance and market valuation; moreover, firm level corporate governance matters more in countries with weak shareholder protection and poor judicial efficiency. It is suggested that firms could partially compensate for ineffective laws and enforcement by establishing good corporate governance and providing credible investor protection [Klapper and Love, 2002]. Moreover, the firms with relatively low profitability, with low proportion and "poor quality" of non-executive directors and with dual Chairman and CEO are more likely to be acquired than firms are with good profitability, with majority proportion and good quality of non-executive directors and with separated posts of chairman and CEO [Weir, 1997].

OBJECTIVE OF THE STUDY

The present paper aims to study the expectations of shareholders regarding their equal treatment with respect to different demographic characteristics including gender, age, profession and investment experience.

RESEARCH METHODOLOGY**Nature and Sources of Data**

The present study is based on primary as well as secondary data and information to achieve its research objectives. For this study, sampling elements comprised of five hundred shareholders.

Statistical Procedures and Techniques

The primary data collected through sample survey are subjected to statistical analysis with the help of SPSS 13.0 software. The main statistical techniques used for subjecting the primary data include frequency distribution, mean, SD, and f test.

Reliability Analysis

To measure the reliability of responses Cronbach's alpha test was used and its value was 0.96 which shows very high consistency.

RESULTS AND DISCUSSION

This section discusses about the expectations of shareholders regarding this aspect, i.e. equitable treatment of shareholders. This aspect covers seven statements, for which shareholders' expectations are asked, namely, one share one vote rule, cumulative voting for minority shareholders when they vote for elections of directors or outside directors, disclosure of transactions details within specified time in case of insider trading, penalties should be attached to the offence of insider trading, disclosure of all related party transactions, approval for related party transactions by shareholders and abstinence of related persons from voting on transactions.

Table-1: Expectation Level for Corporate Governance Variables Concerning Equitable Treatment of Shareholders

Title	N	Mean	St. Dev.	P-value	SD	D	N	A	SA
One share one vote rule	495	3.29	1.54	0.00	107	60	67	104	157
Cumulative voting for minority shareholders for elections of directors or outside directors	495	3.95	1.03	0.00	10	38	99	166	182
Disclosure of transactions details within specified time in case of insider trading	495	4.36	0.77	0.00	3	3	63	170	256
Penalties should be attached to the offence of insider trading	495	4.51	0.80	0.00	1	17	40	107	330
Disclosure of all related party transactions	495	4.07	1.01	0.00	6	36	91	147	215
Approval for related party transactions by shareholders	495	4.19	0.81	0.00	2	15	68	213	197
Abstinence of related persons from voting on transactions	495	4.13	0.98	0.00	5	27	98	133	232

Table 1 illustrates means, SDs and p-values of the responses regarding expectations towards factors associated with equitable treatment of shareholders. The results disclose that most of the respondents (437) agree/strongly agree with the statement that companies should attach heavy penalties to the offense of insider trading with mean value 4.51 and SD 0.80; and of all respondents 426 agree/strongly agree with the statement that transaction details should be disclosed within a specified time in case of insider trading with mean value 4.36 and SD 0.77. Moreover, majority respondents want disclosure of all related party transactions (mean = 4.07 and SD = 1.01), its approval by shareholders (mean = 4.19 and SD = 0.81) and abstinence of related persons from voting on transactions (mean = 4.13 and SD = 0.98). In addition, 261 of 495 respondents expect that there should be one share one vote rule (mean = 3.29 and SD = 1.54) and most of the shareholders also want that there should be a cumulative voting system for minority shareholders when they vote in elections of directors or outside directors (mean = 3.95 and SD = 1.03). The mean values exhibit that, all variables attributed to equitable treatment of shareholders are considered highly expected by the sampled respondents as all have mean value more than the neutral value (3). Substantially, the results also depict that all the seven variables related to equitable treatment of shareholders with $p < 0.05$ present significant difference with respect to neutral value 3. It infers from these results that shareholders' expectations are very high in relation to shareholders' equitable treatment.

Table-2: Gender wise Respondents' Distribution

Gender	Frequency	Percent
Male	451	91.1
Female	44	8.90
Total	495	100.0

Table-3: Gender -wise Analysis of Expectation Level for Variables Concerning Equitable Treatment of Shareholders

Title	Gender	N	Mean	SD	t test	Sig
One share one vote rule	Male	451	3.29	1.56	-0.12	0.90
	Female	44	3.32	1.36		
Cumulative voting for minority shareholders for elections of directors or outside directors	Male	451	3.97	1.03	1.07	0.29
	Female	44	3.80	1.00		
Disclosure of transactions details within specified time in case of insider trading	Male	451	4.37	0.78	0.58	0.56
	Female	44	4.30	0.63		
Penalties attached to the offence of insider trading	Male	451	4.51	0.82	-0.49	0.62
	Female	44	4.57	0.70		
Disclosure of all related party transactions	Male	451	4.06	1.03	-0.47	0.64
	Female	44	4.14	0.77		
Approval for related party transactions by shareholders	Male	451	4.17	0.83	-1.51	0.13
	Female	44	4.36	0.57		
Abstinance of related persons from voting on transactions	Male	451	4.12	1.01	-1.00	0.32
	Female	44	4.27	0.66		

Table 3 discloses the gender-wise attribution of respondents with regard to their expectations for variables related to equitable treatment of shareholders. The table depicts means, SDs and the results of t-test for all these variables with respect to gender. It can be seen from the table that the females depict precedence over the males with respect to all the variables except two, which are, 'cumulative voting for minority shareholders when they vote in elections of directors or outside directors' and 'disclosure of transaction details within the specified time in case of insider trading' but these differences are not significant at the five percent level of significance. From this analysis, it is apparent that the perceived expectations associated with equitable treatment of shareholders are not significantly different across males and females.

Table-4: Age wise Respondents' Distribution

Age in years	Frequency	Percent
Under 25	47	9.50
25-35	284	57.40
35-45	109	22.00
45-55	44	8.90
55 and above	11	2.20
Total	495	100.00

Table-5: Age-wise Analysis of Expectation Level for Variables Concerning Equitable Treatment of Shareholders

Years	Under 25			25-35			35-45			45-55			Above 55			Total			Test	
Title	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	F	Sig.
One share one vote rule	47	3.34	1.40	284	3.36	1.44	109	2.94	1.74	44	3.68	1.68	11	3.18	1.66	495	3.29	1.54	2.35	0.05
Cumulative voting for minority shareholders for elections of directors	47	3.55	1.06	284	4.00	0.89	109	3.87	1.24	44	4.23	1.18	11	4.18	0.75	495	3.95	1.03	3.07*	0.02
Disclosure of transactions details within specified time in case of insider trading	47	4.40	0.77	284	4.38	0.72	109	4.21	0.84	44	4.52	0.88	11	4.36	0.81	495	4.36	0.77	1.62	0.17
Penalties attached to the offence of insider trading	47	4.49	0.88	284	4.49	0.77	109	4.56	0.82	44	4.48	0.95	11	4.73	0.47	495	4.51	0.80	0.36	0.84
Disclosure of all related party transactions	47	4.13	0.99	284	4.08	1.56	109	3.96	1.19	44	4.14	1.11	11	4.36	0.81	495	4.07	1.01	0.63	0.64
Approval for related party transactions by shareholders	47	4.00	0.78	284	4.14	0.81	109	4.31	0.79	44	4.48	0.66	11	3.73	1.19	495	4.19	0.81	3.84*	0.00
Abstinance of related persons from voting on transactions	47	4.00	1.00	284	4.12	0.94	109	4.17	1.05	44	4.27	1.02	11	4.00	1.10	495	4.13	0.98	0.55	0.70

*Significant difference at five percent level.

Table 5 demonstrates the age-wise analysis regarding respondents' expectations with respect to all variables concerning equitable treatment of shareholders. The grand mean infers that all these variables are highly expected by all the respondents, but respondents from different categories of age group demonstrate significant difference in their responses at 5% level of significance with respect to only two variables, that are 'cumulative voting for minority shareholders when they vote for elections of directors or outside directors' with $p = 0.02$ (< 0.05) for $F = 3.07$ and 'approval for related party transactions by shareholders' with $p = 0.00$ (< 0.05) for $F = 3.84$. The results reveal no significant differences between respondents' expectations with respect to remaining variables about equitable treatment of shareholders across different age groups of respondents.

Table-6: Investment Experience wise Respondents' Distribution

Experience in years	Frequency	Percent
Under 5	224	45.30
5-10	190	38.40
10-15	52	10.50
15-20	18	3.60
20 and above	11	2.20
Total	495	100.0

Table-7: Experience-wise Analysis of Expectation Level for Variables Concerning Equitable Treatment of Shareholders

Years	Under 5			5-10			10-15			15-20			Above 20			Total			Test	
Title	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	F	Sig.
One share one vote rule	224	3.40	1.42	190	3.12	1.59	52	3.38	1.72	18	3.33	1.94	11	3.45	1.64	495	3.29	1.54	0.95	0.44
Cumulative voting for minority shareholders for elections of directors	224	3.93	0.94	190	3.86	1.09	52	4.27	0.97	18	4.50	1.04	11	3.64	1.50	495	3.95	1.03	3.22*	0.01
Disclosure of transactions details within specified time in case of insider trading	224	4.34	0.77	190	4.31	0.78	52	4.50	0.73	18	4.56	0.78	11	4.64	0.67	495	4.36	0.77	1.34	0.26
Penalties attached to the offence of insider trading	224	4.50	0.81	190	4.45	0.84	52	4.69	0.64	18	4.83	0.52	11	4.55	0.93	495	4.51	0.80	1.73	0.14
Disclosure of all related party transactions	224	4.16	1.66	190	3.84	1.13	52	4.44	0.83	18	4.44	0.98	11	3.91	1.22	495	4.07	1.01	5.62*	0.00
Approval for related party transactions by shareholders	224	4.15	0.79	190	4.15	0.82	52	4.40	0.87	18	4.44	0.92	11	4.27	0.65	495	4.19	0.81	1.67	0.16
Abstinance of related persons from voting on transactions	224	4.15	0.90	190	3.95	1.09	52	4.46	0.83	18	4.78	0.55	11	4.27	0.91	495	4.13	0.98	5.26*	0.00

*Significant difference at five percent level.

Table 7 illustrates the investment experience-wise differences between respondents' expectations regarding variables related to equitable treatment of shareholders. The results present that there is statistically significant differences (at five percent level) between expectation levels of respondents with different span of investment experiences for three variables, namely, 'cumulative voting for minority shareholders when they vote for elections of directors or outside directors' ($F = 3.22$, $p = 0.01$), 'disclosure of all related party transactions' ($F = 5.62$, $p = 0.00$) and 'abstinence of related persons from voting on transactions' ($F = 5.26$, $p = 0.00$).

Table-8: Profession wise Respondents' Distribution

Profession	Frequency	Percent
Businessman	79	16.00
Serviceman	170	34.30
Chartered Accountant	75	15.20
Teacher	76	15.40
Others	95	19.20
Total	495	100.00

Table-9: Profession-wise Analysis of Expectation Level for Variables Concerning Equitable Treatment of Shareholders

	Businessman			Serviceman			Chartered Accountant			Teacher			Other			Total			Test	
Title	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	F	Sig.
One share one vote rule	79	2.68	1.73	170	3.40	1.49	75	3.65	1.52	76	3.45	1.54	95	3.19	1.39	495	3.29	1.54	4.74*	0.00
Cumulative voting for minority shareholders for elections of directors or outside directors	79	3.70	1.20	170	4.04	0.95	75	4.11	0.99	76	4.07	1.01	95	3.81	1.00	495	3.95	1.03	2.64*	0.03
Disclosure of transactions details within specified time in case of insider trading	79	4.05	1.00	170	4.39	0.75	75	4.64	0.67	76	4.30	0.73	95	4.39	0.61	495	4.36	0.77	6.08*	0.00
Penalties attached to the offence of insider trading	79	4.61	0.72	170	4.38	0.92	75	4.73	0.66	76	4.62	0.65	95	4.41	0.79	495	4.51	0.80	3.72*	0.01
Disclosure of all related party transactions	79	3.67	1.26	170	4.08	0.88	75	4.45	0.81	76	4.03	1.06	95	4.11	2.38	495	4.07	1.01	6.13*	0.00
Approval for related party transactions by shareholders	79	4.13	0.77	170	4.15	0.83	75	4.32	0.87	76	4.28	0.70	95	4.14	0.83	495	4.19	0.81	1.04	0.39
Abstinance of related persons from voting on transactions	79	3.80	1.18	170	4.10	0.95	75	4.47	0.89	76	4.26	0.90	95	4.09	0.89	495	4.13	0.98	5.07*	0.00

*Significant difference at five percent level.

Table 9 presents the profession-wise analysis regarding expectations for all these seven variables covering equitable treatment of shareholders. The values of f-test prove that there exist statistically significant differences in expectation levels of respondents belonging to different professions for all the variables except one, i.e. 'approval for related party transactions by shareholders' at the 5 % level of significance. That means respondents belonging to different professions have different level of expectations about these variables as all account $p < 0.05$ for their respective F test values.

CONCLUSION

It concludes that the sampled respondents have high expectations for all above mentioned variables encompassing equitable treatment of shareholders across independent variables of sampled respondents. In addition, a difference across responses appears mainly due to different professions of respondents. Age and investment experiences of respondents also have some effect with regard to a few variables.

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**WORK GROUP ORIENTED LEADERSHIP BEHAVIOURS AND THEIR IMPACT ON PRODUCTIVITY:
AN ANALYTICAL STUDY WITH REFERENCE TO BANK EMPLOYEES**

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ABSTRACT

Indian banking sector has been implementing various reforms to enhance its accountability and transparency for performance outcomes. The most important Perspective is to focus on developing capacity of leadership to achieve the expected performance. And also to capture its impact on the agenda of banking sector reform and contextualizing the leadership accountability for better governance in sustaining banking sector performance outcome in the 21 century.

The leadership roles in banking sector places a strong emphasis on how to manage work group productivity based on the result/outcome especially in times with high levels of volatility, uncertainty, and complexity.

Leadership accountability for sustainable performance outcomes has been becoming a key issue in leading and managing banking sector organisation around the world.

The result of the study also enhances the existing theory on leadership behaviours that promotes balanced performance outcomes in banking sector; and finally emphasises alignment and engagement link between leaders and work group productivity to support high performance governance culture in banking organisation.

Keywords: Leadership Behaviour, work group, Productivity, Performance Banking Industry

1. INTRODUCTION

The public sector banks are signifying itself to meet the expansion in demand, optimize resource utilization, enlarge its presence across the value chain, focus on R&D and innovation, and better service customer demands. They are undertaking so by collaborating their active capabilities so as to respond to business priorities. Leadership constitute the basic building blocks of an organisation capability. These capabilities ensure that the organisation adapts, continues to learn and acts faster than competition

Research conducted on public sector banks highlights that leadership and leadership behaviour is a critical competence for current and future success. Every business imperatives has its consequent impact on the leadership behaviours.

An organization's performance is directly linked to its leader's effectiveness. In fact, extraordinary leaders can make extraordinary employees out of average employees.

Leadership behavior is a human factor that builds work groups together and motivates it towards achieving the established goals. It's hard to see how an organization can continue to exist without effective leadership in place. One of the major obligations of leadership is integrity between words and deeds. And an even more powerful shadow cast by the senior team is how they interact with each other Mconnel&Servaes, (2000).

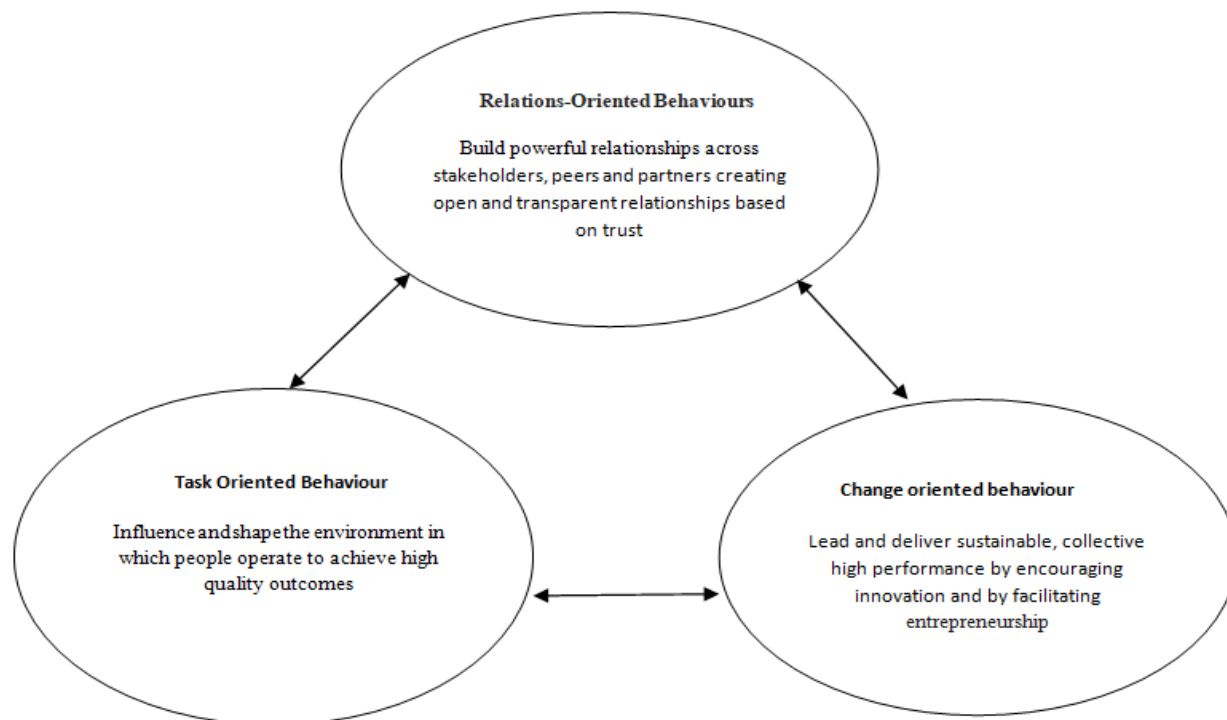
Extremely dynamic work environment, fast changing technology, work force diversity, and extended business portfolios exerts stress on the current day business leaders. Above mentioned causes demand banking industry with result oriented leadership behaviours which exert flexibility and receptiveness. High performance leader teams recognize that their combined and individual behavior casts a positive or negative shadow across the entire organization. And employees tend to take their cues on what is significant and how to perform from their leaders, any negative behavior at the top results in negative behaviors far down into the organization, unfavourably impacting performance and productivity.

Leaders collectively translate there actions into certain unique behaviours, which they have to demonstrate among subordinates at every level of interaction. Based on research, it has been identified that there are 3 important leadership competencies or behaviours which help leaders in the public sector banks to deliver on key business imperatives.

These behaviours are stated as **Relations-Oriented Behaviour**, **Task Oriented Behaviour** and **Change oriented behaviour**. Public sector banks with the above mentioned leadership behaviours can strengthen their existing capabilities and build new capabilities so as to appropriately respond to the given business imperatives and gain productivity .

The article *A Hierarchical Taxonomy of Leadership Behavior: Integrating a Half Century of Behavior Research* by Gary Yukl seeks to determine which behaviors are meaningful for leaders. Yukl states that behavior can be categorized into three different categories: task related behavior, relationship related behavior, and change oriented behavior. Leaders who have primarily task related behavior focus on production and like structure. Leaders who prefer relationship related behavior often are inspiring and find trust/support to be extremely important. Change oriented leaders are typically creative, take risks, and focus on the future.

Although a successful leader must implement all of these behaviours and should first build trust and support, and then it would be able to accomplish tasks well, later may seek changes if the situation calls for it.



Task oriented leadership behaviour

Task-oriented leaders have a tough orientation for getting the job done and on time. When leading employees, task-oriented leaders naturally set out easy-to-follow work schedules with needs and deadlines. Because of their task-orientation, they are also typically good at following up on tasks to measure the progress and output. Task-oriented leadership behaviours works particularly well in environment where job responsibilities are easily defined and predictable.

Task-oriented leaders uphold a high standard for performance. They expect employees to bring the desired results in the agreed time. By driving a high task emphasis, they leave employees little room for idle chat or goofing around. In certain environments and work tasks, this can improve efficiency in production. Employees need organize and manage themselves with time management they tend to work better within prescribed strategy laid out for them in advance of time.

People oriented leadership behaviour

People-oriented leaders know their employees' strengths and talents and they allow people to position themselves in such a way that they can take advantage of there positive features. Leaders who understand and focus on the human element in managing are assumed most likely to be received as the true leaders they are also technically knowledgeable in their position, inspire and motivate their workforce. These leaders are often the reason that people remain committed and loyal to an organization.. These leaders also know that the key to achieving goals and accomplishing missions are the people whom they supervise. They understand people and unlock the potential in each and every employee to achieve organizational goals

Change oriented leadership behaviour

Change oriented leadership behaviour is all about phases of change and emotions associated with those phases .they help people to address and adopt the change .Change leadership behaviour is to meet and over come the challenges of change .It is all about being with people during change process and keep them committed and focused trough out by motivating and supporting them to face uncertainties and distractions. Hence the role of leaders in making change happen is considered extremely crucial and important.

2. LITERATURE REVIEW

Leadership continues to be a subject of study in the modern world (Zaccaro, 2007). The extensive research during the past six or seven decades has not exhausted the topic of leadership, on the contrary, it has discovered new aspects of leadership and opened uncharted territory for further study and research (Bennis, 2007)

From these early studies of great leaders of history, researchers and theorists in the early 20th century identified traits that set these great leaders apart from the average person. Later empirical evidence revealed that these lists of traits were inconclusive and failed to capture the essence of leadership or provide a solid framework to identify effective leaders (Johns & Moser, 1989)

Katz's (1955) perspective that leaders are not defined solely by who they are but by what they do was in response to the notion espoused by the Trait Theory that leaders are defined by certain personality traits. He suggested that "effective administration rests on three basic developable skills" (p.34) which, he said, are technical skill, human skill and conceptual skill. Katz put the emphasis on the fact that these skills are developable; they can be learned. This notion placed leadership within closer reach of those who desired to be leaders. It indicated that leadership is not tied to personality characteristics or traits that are unchanging and non-transferable.

In the recent past, there has been considerable emphasis on the personal traits or behaviours of leaders, and a search to find the competencies which are most clearly associated with effective leadership. More recently still, there has been a growing awareness also of 'the dark side of leadership' (Burke 2006; Hogan and Hogan 2001), highlighting not only the limitations but also the dangers of particular leadership traits, styles and activities. For example, some research shows how charismatic leaders can create overdependence others they work with (Bryman 1992; Burke 2006); and it has been argued that charismatic individuals can also undermine the more plural and participative processes of group decision-making in democratic societies (Hartley and Benington 2010).

Yukl (2006) noted that: 'Leadership research has a narrow focus, and there has been little integration of findings from different approaches' (pp 445). This lack of an integrating framework has been noted by other writers (eg Storey 2004; Grint 2000; Burke and Cooper 2006). Burns (1978) wrote that leadership is one of the most observed and least understood phenomenon on earth' (pp 2). Since then, there has been an explosion of interest in leadership (Rogers et al 2003) in policy discourse and in practice (eg the recent mushrooming of leadership development programmes in the public sector, the wider use of the discourse of leadership in policy documents). Some have observed that leadership has taken over from management as the latest buzz word in government and public services, and is presented as though it is the solution to many intractable problem situations (eg, Martin and Learmonth 2011).

An emerging approach, characterised as critical leadership studies (Martin and Learmonth 2011; Jackson 2005; Ladkin 2010; Zoller and Fairhurst, 2007; Collinson 2011), is more questioning about the benefits of leadership, highlighting the darker dimensions of power, control and manipulation which may be present in the processes and outcomes of leadership.

There are a range of definitions of leadership in the field, often reflecting differences in emphasis between competing concepts of leadership (Hartley and Benington 2010). It is useful to start with a working definition which will help delimit the areas we are concerned with. Stogdill's 1950 definition still has value.

Sagino (2002), points that in handling risk, leaders are supposed to handle company's operations by encouraging subordinates to handle uncertainty, face adversity with composure, understand others by showing empathy and maintaining performance. They develop their skills and knowledge by studying behaviour of successful managers in completing specific tasks that will help them achieve higher performance in attaining their set objectives. In his work, William Sayer, (2005), says that participative leaders recognize that building relationships and establishing effective team usually leads to sustainable creative solutions to performance.

3. RESEARCH METHODOLOGY

Research methodology explains the method of conducting research and shows the logical sequences of the steps involved in research. Research methodology includes the following:

3.1 Problem Statement

Literature on leadership indicates much of offered theory focuses on effective leadership styles either at individual or managerial level. Little stress is positioned on the whole of leadership behaviours and less concern is put on integrating leadership behaviour framework at all levels of the organization.

3.2 Objectives of the study

- To determine how leadership behaviour Influence and shape the environment in which people operate to achieve high quality outcomes in public banks
- How leaders Build powerful relationships across s, peers, stakeholders and partners to create open and transparent relationships which enhance performance and productivity in banks
- Which are the core and integral leadership behaviours that enhance organizational values, employee's code of conduct & increase costumer service standards in public banks.
- How leadership behaviours helps to drive and develop a continues improvement by engaging workforce and face lifting there creativity in achieving objectives

3.3 Type of Research

This research is descriptive research. The topic is theoretical and relating to this the data are collected from banking sector from different banks. The practices followed in different banks relating to manpower, performance and labour productivity are studied intensively.

The descriptive research is most suitable to the topic selected.

3.4 Sources of Data

For the study purpose both primary and secondary data are used. The primary data collected from employees, their supervisors, managers and customers. The secondary data collected from financial statements of last 5 years from different banks, HR policies of banks and reports of RBI and governments. These data used in combination as per need of the study.

These data having different merits and demerits and serves the purpose of the research.

3.5 Instruments for Data Collection

For research study data were collected with the help of instruments. These instruments are questionnaire, interview, telephones/ mobiles, internets etc. These have been used according to the requirements of the study and availability of instruments. These have been used in combination to meet the requirement of the research study.

3.6 Sampling

For data collection sampling has been used because the universe is very large and it was very difficult to study the whole universe so the sampling process has been used. The customers and banks employees from major cities and their surrounding have been selected It has been assumed that the behaviour of customers and banks employees across the country is similar to the customers and employees located in Karnataka region.

For data collection stratified random sampling has been used. The universe was divided in Bangalore Rural and Bangalore South regions from Karnataka and from each region the 100 to ensure that the sample is proper representative of the universe to maintain the accuracy of data and manage the research effectively.

Table No-1

Reliability Statistics

The developed questionnaire has undergone Cronbach Alpha testing for testing its reliability and the value is given below

Particulars	Cronbach's Alpha	No. of Items
Value	0.0912	47

Table No.1.1

KMO and Bartlett's Test

The following table shows the variables with the corresponding extraction communality factor value.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		
Bartlett's Test of Sphericity	Approx. Chi-Square	511.125
	df	47
	Sig.	0.002

3.7 Time Duration

To carry out the study the time specified for the research work is 05 Months and it has been completed and submitted within the permitted time period.

3.8 Statistical Tools for Data Analysis

For data analysis measures of central tendency, average, variance etc. are used. For testing of hypothesis Chi-square has been used.

3.9 Hypotheses:

The following hypothesis will be tested with the help of statistical tools:

(i) Null Hypotheses

H0: There is no statistically significant difference amongst selected banks respondents regarding labour productivity ratio.

H0: There is no statistically significant impact of labour productivity on business performance of selected banks.

(ii) Alternative Hypotheses

H1: There is significant difference amongst selected banks regarding labour productivity ratio.

H1: There is significant impact of labour productivity on business performance of selected banks.

(iii) Hypotheses Testing

With reference to all the above testing, the chi-square test inferences that there is an important difference between the banks and their labour productivity ratio. There is significant impact of employee's productivity on business performance of selected banks.

The management of banks are highly interested to improve the productivity of every employee in the organization because the employees play crucial role in getting competitive edge over competitors in banking. There is strong agreement that the employees providing banking service to customers are the service providers, organization for customers, brand and marketers.

Therefore, all the banks (public sector, private sector, foreign, and cooperative banks) are more conscious about higher productivity and performance of employees. Therefore, it is concluded that that employees are products, brand, organization for customers, and marketers for customers.

4. LIMITATIONS OF THE STUDY

To carry out the research study the following limitations were expected and faced

- (a) Availability of secondary data from banks was difficult.
- (b) Employees avoided or hesitated to give relevant data.
- (c) Management did not like to share their views on the topic.
- (d) Time, cost and location factors caused difficulties.
- (e) Sample size might not be exact representative of the universe.

However sincere efforts have been put to overcome the limitations faced.

5. CONCLUSION

Leaders in public sector organisations need to practice an effective leadership behaviour and framework in implementing balanced performance which enhances productivity that lead organisation to achieve sustainable success outcome.

This paper suggest that there has to be a positive relationship between the leaders and employees in banks; these positive relationship enhance commitment .It also suggests that leadership behaviours which involve building confidence, inspiring a shared vision, encouraging creativity and emphasising development are positively related to employee commitment. While the Study interrogates the phenomena of leadership behaviours that can assist in motivating the bank staff. It can be concluded that behaviours of leaders can be a source to increase organisational commitment and employee's productivity.

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REBOOTING INDIAN HIGHER EDUCATION: From Rigid to Agile

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ABSTRACT

Education in India dates back to the early Vedic Age, where the teaching and learning process was based on the 'Gurukul System'. The Gurukul system is an ancient education method with the curriculum built on the 3S model (Self-control, Social Awareness and Spiritual Development). The most radical change in this ancient Indian style of higher education (which we can refer to as HE 1.0) was introduced by the British where the curriculum and delivery methods were based on the 3L model (Language, Linguistics and Literature). Under the 3L Model, the emphasis was to boost English language as a medium of instruction and communication, with an objective to fill vacancies that cropped up in the ambit of British Administrative Services in India.

Post-Independence, India saw Higher Education 2.0 focusing on the STEM model (Science, Technology, Engineering and Management). Under this model, many Institutions of National Importance were formed. With the passage of time, the Indian Higher Education witnessed a steep increase in its GRI (Gross Enrolment Index) and this posed a big challenge to the Government Institutions to cater to the needs of mass applicants. This resulted in HE 3.0 which encouraged P3 model (Public Private Partnership). The Nextgen companies are complaining about employability issues of graduates as they opine that graduates lack the skillsets required by organizations. The corporates are of the collective opinion that graduates are failing to meet the requirements of Industry 4.0. This is perhaps an indication that there has to be a reboot of the Indian Higher Education - which should move to become an agile model.

The authors of this research paper strongly feel that HE 4.0 should focus on the E3 model (Education, Employability and Employment) for addressing the current concerns around skill development of graduates at the higher education level. The current lot of graduates appear ill-equipped to meet industry needs and expectations, and the need of the hour is to enhance the skill matrix that can lead to job creation. This research paper elaborates on how the E3 model can fit into the requirements of Industry 4.0. The researchers have gathered data using purposive sampling which involved personal interactions with Deans/HODs/Principals of various Higher Education Institutions (HEIs) in Bengaluru. The preliminary literature review led the researchers to believe that the concept of the E3 model itself is still in a nascent stage in Higher Education, and academicians are yet to find a common track to precisely define and measure it. Furthermore the E3 model has to necessarily go through a process of refinement over a period of time, conceptually, as well as in terms of applicability and reality-testing. Accordingly, the researchers have tried to gather data, information, and views regarding the subject through secondary published sources (on studies that have been sparsely conducted, both globally as well as in India) in National and International Journals of repute. Based on information gathered from these twin sources, the researchers have derived an E3 structure and a model has been conceptualized. Specifically, the discussion in the paper is on the following:

*A. Indian Higher Education – Current Scenario**B. Background of Higher Education System**C. Understanding E3 Model for enhancing the performance of Higher Education.**Keywords: Higher Education, Employability, Skill, Job Creation.*

A. INDIAN HIGHER EDUCATION – CURRENT SCENARIO

Indian higher education system is third largest in the world, comprising of 799 universities and 39,071 colleges. About two-thirds of colleges are privately managed, and more than half are in rural areas. While adult literacy levels are rising, only 6% of Indian citizens graduate from a college (MHRD 2016). In absolute terms, however, the numbers are large: about 31.56 million Indian students are enrolled in colleges and universities. By 2030, India would become one of the youngest nations in the world with a college going age group population of around 140 million people. The daunting question that still remains unanswered is - can India build world-class higher education system? The quest to create "world-class" universities is a global obsession since the past decade as governments across the world have placed the development of competitive higher education and research systems at the heart of their national economic strategies. The time has come where one needs to introspect on whether the current inexorable focus on rankings is required by Indian higher education or not.

Indian higher education is also working towards collaborating with the world class universities. In the current scenario it is very disheartening to note that only a few Indian universities and colleges have substantially built relationship with foreign institutions for course delivery, co-creating research work, and for various exchange programmes for faculty and students. Some of the private universities and colleges have succeeded in promoting international tie-ups by adopting the curricula of foreign institutions and by offering twinning programs. But, the objectives are skewed towards improving their Indian market position. There is a general perception that a foreign-integrated institution has efficient faculty and infrastructure. This may not be realistic in all cases. These institutions are attracting students by offering foreign degrees at economical tuition fees as compared to institutions abroad. Through twinning programs Indian institutions are giving opportunities to students to gain international exposure and experience by them for a semester to the partnering institution's campus in their home country. However, this format of higher education gives rise to another question of whether students coming out of these institutions can really broaden their skills and horizons simply by following an adopted curriculum!

B. BACKGROUND

The Department of Higher Education, MHRD - with the vision of utilising India's human resource capacity to its maximum in the Higher Education sector with equity and inclusion - is in charge of the entire development of the basic infrastructure of the Higher Education sector, with regard to both policy and planning (MHRD, 2016). This division takes care of expansion of access and quality check in the education system. India has highest number of educational institutions in the world and stands third with respect to the size and its diversity (PWC, 2012). India's development in the area of social, industrial and economic development is contributed by Higher education system. As per Sharma, S & Sharma P (2015) the role of Indian higher educational institutes such as colleges and universities in the current scenario is to empower youth for self-sustainability and this shall happen through quality interventions in the field of education, research etc. In India, MHRD, Department of Higher Education is the top most form of authority, that acts more as a canopy organization. Apart from the regulation from the ministries, Higher Education is also influenced by around fifteen regulatory bodies who perform correlating roles. In several cases Indian Higher Education has been complemented and contradicted from the Judicial system on the Higher Education objectives. (Agarwal, 2006). This has created certain vagueness in the interpretation of policy documents including its accountability and answerability. Higher education is also subjected to lot of criticism that the control reigns rely in the hands of political dogmas (NKC, 2009). In India, it has always been the combined responsibility of both the Central and the State governments. India being the seventh largest country in the world and the second largest country by population count has to seize the opportunity and infallibly concentrate on her higher education sector as a source of growth in the current knowledge-driven marketplace (Joshi, 2013). Entangled in this maze of challenges, lie the opportunities for India to emerge as numero uno on the global map.

D. NEED OF THE HOUR

Education: The Indian Education System always emphasized on testing than to teaching skills This has seeded to a practice whereby knowledge is tested at regular intervals without giving much weightage to the teaching skills. There are many such deep-rooted hurdles in the education system which needs attention. Many education services face imperfections in the system and these flaws does not allow the universal demand for good education unravel into a bigger marketplace (CSE, 2018). In order to address the humungous population, India needs to embrace internet and technology in a much superior way.

Hence, it has become more evident to invest in technological infrastructure that facilitates access to knowledge much better than what exists today. It is the need of the hour to outgrow from the systems of old formats and obsolete teaching-learning models and adapt to constructive educational delivery models and mechanisms. This dissemination can happen through easy access of high speed internet on smartphones and personal computers. Even though there are many changes happening in the field of technology, there is a wide scope for innovation in this space. Our system breeds significant number of engineering graduates every year but when we map the technological innovation and the engineering graduates we get to see a lien contribution towards.

The Indian Higher Education system must look beyond generating same set of graduates who are currently using their engineering skills in managing the BPO/BPM centres for the rest of the world. The objective of our new enhanced education system should be to produce entrepreneurs, intrapreneurs, innovators, designers, scientists, avant-garde thinkers and writers who can lay the foundation of a knowledge-based economy rather than be contented with the status quo, wherein we are perceived to be a low-cost service provider nation.

Employability: India has numerous higher educational institutions catering to wide-ranging aspirants. This will strengthen the Indian Labour requirement both in national and international market resulting in massive demand

for skilled and qualified labour. The alarm for Indian Higher Education has always been the employability of higher education graduates. One has to realise that it is not just the unschooled and unqualified people need to have skill training also the educated graduate is expected to meet industry standards.

This prevailing need make Indian higher education system to cope up with the pace of VUCA world. Many Suggestions have already been carved to plug the gaps but the rubric to measure the outcome has to be modified in such a way that the trinity of Education-Employability-Employment get addressed in a more meaningful manner.

Industry 4.0 is looking for certain attributes and personality traits while recruiting and selecting suitable graduates and to meet this demand of industry, higher educational institutes should come up with curriculum 4.0 by cocreating the syllabus and other academic requirements.

Employment: The biggest challenge facing India's policymakers and administrators is the rapidly rising unemployment (CSE, 2018). Confirming and building on a view held by the critics of India's economic reforms process, the study points out that the relationship between growth and employment generation has become weaker over time (Mona, 2014). The unemployment rate in India has shot up by almost two times between the period July 2017 and April 2018. The CMIE 2017 report states that the number of jobs in India in the previous financial year of 2017-18 also declined to 40.6 crores from 40.67 crores as compared to the preceding year. The unemployment rate in the country rose from 3.39% in July 2017 to 6.23% in March 2018, and was projected to reach 6.75% in April 2018 (CMIE, 2018). Technological advancements and rapidly disrupting business models are structurally shifting the Indian employment landscape as the world's largest democracy faces a critical issue of skill development amidst rising unemployment. India is the youngest nation with more than 54 percent of its total population below 25 years of age, and 62 percent in the working age group of 15-59 years (ISR, 2018). As a solution to this problem, the Government of India has formulated the National Policy on Skill Development and set a target of providing vocational education and training to 500 million people by 2022. To reach this target, various stakeholders are involved. However, this alone will not solve the problem of outdated skills. The educational institutions on their part will have to emphasize on learning that is skill-based. One of the solutions is including entrepreneurship in school curriculum across all boards. This will inculcate creativity and innovation in the minds of youth, who can be potential entrepreneurs going forward. This is essential because various studies have indicated that most of the skill requirements in a decade will be for jobs which do not exist as of now.

CONCLUSION

Change is a complex process that involves people, organizations and processes (Almeida, 2017). The introduction of agile methodologies in an education system brings with it numerous benefits deriving from the characteristics of E3 practices. Technology is playing a crucial role to gear up the pace of development. Higher education aspirants are more keen on value for money. This leaves every institutional leader to ponder upon leveraging technology in executing institutions mission and understand the need to reboot the learning mechanism for the Industry 4.0.

Change is a complex process that involves people, organizations and processes. The introduction of agile methodologies in an organization brings with it numerous benefits deriving from the characteristics of these practices, but there is a resistance to its adoption on a large scale by the engineers and managers. Four dimensions of challenges were identified within the context of this work. The first dimension is the people, in which we can find challenges in terms of personal education, experience and commitment, stakeholder involvement, location of teams and stakeholders, available training course and identification of customer needs. A second dimension is the organization and management, in which legal and cultural challenges arise. A third dimension is the process, in which we can find a long list of challenges, particularly the changes in terms of team practices, identification of functional and non-functional requirements, cross-team dependencies, reporting and tracking of projects, quality management, risk management, and scaling. Finally, the last dimension is related to tools, where emerge challenges associated with the technical complexity of projects, integration issues, project assessment and issues tracking.

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LUCKNOW ORGANIZED RETAIL - STILL IN PHASE OF STRUGGLE

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ABSTRACT

There is no doubt that India's organized retail industry is on a high growth still on slow economy phases. Favorable location and demographic benefits, steady economic growth with high disposable incomes, and easy credit facility provide the necessary impulse for the growth of modern retailing formats. However, there are several challenges that continue to cause hurdle in this growth especially in Lucknow region. for this study the primary data was attested on SPSS for validification.

Keywords: Demographic, slow economy, Lucknow region, impulse

INTRODUCTION

There is no doubt that India's organized retail industry is on a high growth still on slow economy phases. Favorable location and demographic benefits, steady economic growth with high disposable incomes, and easy credit facility provide the necessary impulse for the growth of modern retailing formats. However, there are several challenges that continue to cause hurdle in this growth especially in Lucknow region.

RESEARCH OBJECTIVES

- To understand the behavior of unorganized retail sector including customers in reference to organized retail.
- To know the variation amongst various business structure .

LITERATURE REVIEW

Kishore Biyani,(2010-2011) are thrilled to percentage the Annual Report of your corporation for the monetary yr 2010-2011. It became an eventful yr and seen inside the context of the ultimate three years, the period has been marked with the aid of remarkable challenges and interesting opportunities. The core retail commercial enterprise of your organization grew on the compounded increase fee of 31.84% during these final 3 years. The 12 months on 12 months identical-shops-income growth in lifestyle segment changed into 15.56% fee section turned into 10.31%, and in domestic segment changed into 8.32%. These increase fees are comparable with the enterprise; however they believe that your employer is now poised to supply a great deal greater. Building an organization is similar to rearing a toddler from infancy to adulthood. As a brand new born grows up, she requires a massive quantity of nurturing and nourishment. From infancy to adolescence and from youth till she reaches young people, the kid needs attention and most importantly persistence. And then someday, the kid matures right into a young people, equipped to face on their very own, make their personal mark and make their mother and father and own family participants who took in all the hardships proud. So it is with agencies.

From a begin-up to its boom segment and until it reaches a regular-state, an organization needs disproportionate quantity of nurturing and resources. It desires to explore possibilities and possibilities, benefit expertise and information, and build an atmosphere around it to reinforce its foundation for the destiny. Organizations are like residing organisms and it's miles similarly vital to inculcate the proper subculture and values, expand symbiotic relationships with its stakeholders and recognize the arena around it. And then someday, it transforms from adolescence to youth – prepared with veins and muscle groups which could create considerable price for all stakeholders. I accept as true with that your employer is now poised to enter its youth. Most of our retail codec's have now matured. More importantly, the structures and techniques that they have constructed, the infrastructure that they've got evolved and the control bandwidth and skills they've got created are able to delivering disproportionate and worthwhile growth. From here on, our mantra is of getting 'more from the identical.

With all the investments in generation, infrastructure and manpower, they agree with they've got today built an employer that is capable of handing over far more growth and productivity. And consequently they trust that the first-class of instances is ahead people. The Indian consumption tale is but to start in its full glory. In all advanced economies, shops are among the most important companies, wealth creators, employers and they are able to expand prudently and wait patiently for our flip. They thanks on your attention, nurturing and staying power in supporting remodel this very particular agency from its infancy to its teenagers.

According to **Dr S. Mani, 2011** the word 'retail' comes from French word 'tailor ting off, clip and divide' in phrases of tailoring. It became first recorded as a French noun with the means 'sale in small portions' in 1433. Its literal that means for retail became to 'cut off, shred and slice.' When goods and offerings are sold and

offered to stop users, it's far termed as retail. It consists of the sale of products or merchandise from fixed vicinity, which includes a branch store, boutique, kiosk or mall, in small or person masses for direct intake with the aid of the consumer. Retail customers may be small or bulk buyers—shopping for intake for any time frame like an afternoon, week and month/quarter. Organized retail in India today holds only six in step with cent of the market percentage capability in India. It has risen from 0 to 6 in step with cent in a completely short period especially in phrases of volume but now not in phrases of price. The 'bazaar' shopping concept has retained its identification along with the present day-day buying systems that constitute an inspired fusion of street buying and community centric sports.

The retail industry in India is presently developing at a quick pace and is predicted to reach \$1300 billion through 2018 at a CAGR of 10 according to cent. As the purchaser spending have additionally long past up, it is expected to comply with this trend inside the future as properly. In the closing 4 years, the consumer spending in India climbed as much as seventy five in step with cent. By 2013, the organized region is also predicted to develop at a CAGR of 40 per cent. According to a market research file in June 2008 titled, 'Booming Retail Sector in India,' published through RNCOS, organized retail market in India is anticipated to reach US\$50 billion via 2011. The key findings of the record are:

1. Number of buying department shops is predicted to increase at a CAGR of greater than 18.9 in line with cent from 2007 to 2015.
2. Rural marketplace is projected to dominate the retail industry panorama in India by means of 2012 with total marketplace percentage of above 50 in line with cent.
3. Driven by way of the expanding retail marketplace, the third-party logistics market is forecast to reach \$20 billion by means of 2011.
4. Apparel, in conjunction with meals and grocery, will lead organized retailing in India.

Industry professionals are expecting that the next segment of increase in the retail sector will come from the agricultural markets. By 2012 the rural retail marketplace is projected to have more than 50 in keeping with cent of the total market share. **David Roth, 2013** find us in an exquisite time. Our science and generation have advanced to the point in which what they build is handiest confined by our personal imaginations. No longer will they need to take a seat lower back and passively take delivery of the destiny. They can build it. This is why imagining and exploring the destiny is so important. To envision the destiny of retail they used a process called 'future casting'. It's a mix of social technological know-how, technical studies, economics, statistical statistics, global interviews or even a touch science fiction to version what it's going to experience want to stay and keep 10 to 20 years from now. The purpose of the method is to create a practical, reality- based totally imaginative and prescient for the destiny that they are able to then go and construct. As they set approximately 'future casting' the destiny of retail, they quick saw that the experience of buying clearly hasn't changed that tons. Stretching again in history, the human revel in of shopping has remained remarkably the same. What has modified through the years is the items that fill that enjoy. This is why they observed the 'History of Retail in one hundred Objects' undertaking so charming and revealing. The history and the destiny of retail can be informed first-rate thru the items that have and could improve the shopping enjoy. To exceptional provide an explanation for the destiny of retail, they evolved and created new models and frameworks to illuminate every part of the every now and then complicated and varied purchasing revel in for the future. They broke the enjoy of retail into three sections: the face, the bones and the brain. These 3 parts make up someone's holistic enjoy. Whether it's surfing in a store or clicking via a internet site, the Face of Retail captures what they can all see when they shop. How will the bodily and visible revel in of shopping develop and evolve with the advent of new technology and gadgets? Underneath the seen world lies a good sized and complicated community that enables the sector of retail. These infrastructures and deliver chains, fuelled with the aid of innovation and striving for efficiency, are the engines of the enterprise. Retail has usually had 'large records' however with increasing computational intelligence the industry turns into smarter and more responsive than ever. The Brains of Retail will open up new possibilities, enriching the revel in of customers and deepening the relationship to personnel. The future isn't always an accident. The future doesn't simply happen. The destiny isn't what it used to be. The future is constructed each day by means of the moves of human beings and organizations. 'Future Objects' supply us a glimpse into that future. Let's believe what it's going to feel like to be a patron and keep inside the future. Let's ask ourselves what form of destiny they want. Can they ask us to imagine an extensively distinctive future to what they have these days? Can they see a more wealthy, sustainable and aware tomorrow? Building on RAI's industry 'Excellence' agenda from 2013, this year's RAI-TCS expertise initiative on Retail Operations Benchmarking and Excellence Survey (ROBES) specializes in the country of multichannel retail in

India. Consumers have increasingly taken to e-commerce, and retailers in India have responded via gearing up to run this rising business version in tandem with their bodily stores. RAI and TCS have looked at traits on this location to gauge the maturity of modern-day practices and to discover pleasant-in-class KPIs and processes. **Anil Rajpal, 2014** indicate the milestones a company should achieve within the transformative journey closer to becoming a clearly integrated multichannel retailer. The record considers extra than 40 Indian retail brands throughout 4 segments. It highlights the current situation, the quality practices to be pursued, and the improvement possibilities available to outlets. It ambitions to serve as a guiding

However, each task has to create new jobs immediately. Project advent and quantity of jobs generated are broadly to be had on FDI. However, many analysts are more inquisitive about quantifying projects in terms of physical belongings, such as plant and system, in a foreign country. These figures, not often recorded via institutional sources, offer beneficial insights as to how inward funding initiatives are undertaken, wherein sports, by whom and, of route, where. To map those actual investments done in India, EY used statistics from FDI Markets. This is the simplest online database monitoring pass-border Greenfield investments protecting all sectors and international locations international. It offers real-time tracking of investment initiatives and activity creation, with effective equipment to tune and profile companies making investment foreign places. The perceived attractiveness of India for overseas investors. **Jay Nibbe, 2014** define the splendor of a location as a aggregate of image, traders' confidence and the belief of a country's or an area's ability to provide the most competitive benefits for FDI. The field studies was carried out by means of the CSA Institute between July and September 2013, via cell phone interviews, based on a representative panel of 502 international decision-makers.

Business leaders have been identified and interviewed in 25 international locations. Those interviewed have been a worldwide panel of business leaders of all origins, with clear perspectives and revel in of India, comprising:

- 39% North American companies
 - 32% Western European organizations
 - 21% Asian businesses
 - 4% Northern European organizations
 - 3% Middle Eastern companies
 - 1% Central and Eastern European companies
- Out of the total 502 interviews, 50% had been performed in India and 50% outdoor India

Discounts have usually been the most important crowd pullers in retail. Held on specific events some times a year, consumers typically look ahead to those annual events with high expectation and exhilaration. Online retailers have correctly leveraged discounting as a mainstream enterprise model. From being a miles predicted annual occasion, discounting and income have become a manner of life. As a end result, price has emerged as the biggest differentiator riding customers to save on line or in-save. Online outlets have effectively managed to wean away clients on the basis of this method by myself. According to our survey, nearly half the shoppers buy on line because of higher deals and reductions. On the alternative hand, while puzzled about why clients store on-line instead of in-shop, only motives have been determined to be specific to online shops: a) I can store 24x7 online, and b) No need to travel to a bodily store. Interestingly, all different factors may be carried out via bodily stores as properly. Thus, our findings show that the bodily save will continue to persevere because the favored and extra handy channel for purchasing for now, even in the wake of disruptors including the ones mentioned in this file. When seeking out ordinary items like milk and eggs or when searching out that ideal dress for the office gala, customers will nonetheless opt to run to the nearest keep. Having said that, shops are trying to healthy e-tailors' commercial enterprise strategies, each step of the way, if now not outdoing them altogether. A range of retailers have refuted the declare that the whole thing to be had on line is cheap. In truth, a number of on line stores have excluded product classes that don't provide an EBIDTA of more than 20%. The in-store retailer at the identical time is working on quite a number of things like the in-save appearance and feel, value delivered offerings and consumer engagement to make certain customers are in the shop and buying. Retailers are also experimenting with revolutionary advertising and merchandising campaigns especially via cellular telephones. These consist of launching shopping apps, SMS indicators in the course of sales and conversation of cut price codes or coupons. Validating this strategy, 79% of our respondents have admitted that **Rachna Nath, 2015** could be glad to obtain offers or coupons through cellular phones. For the physical store to

preserve a competitive benefit, it's going to must continue to reinvent itself in line with the converting instances. With multiplied competition even in the offline space, stores need to circulate beyond the "simply transacting" business model. It is imperative that they offer clients with an enjoy that could convince them that the brand new product would trade their life. The trend of online outlets coming into the bodily area by using commencing offline shops only emphasizes how multisensory client studies make contributions immensely in constructing lasting relationships with the customer.

On the other hand, while questioned approximately why clients keep on-line rather than in-save, simplest two reasons had been discovered to be exceptional to online stores: a) I can save 24x7 on line, and b) No need to journey to a physical store. Interestingly, all other elements can be accomplished by means of physical stores as nicely. Thus, our findings show that the physical save will preserve to persevere as the preferred and handier channel for purchasing for now, even in the wake of disruptors which includes those mentioned on this record. When searching out everyday objects like milk and eggs or while searching out that ideal get dressed for the office gala, customers will nevertheless opt to run to the nearest save. Having said that, stores are attempting to suit e-tailors' commercial enterprise strategies, every step of the way, if not outdoing them altogether. A quantity of retailers have refuted the claim that the whole thing available on-line is reasonably-priced. In reality, a number of online shops have excluded product classes that do not offer an EBIDTA of greater than 20%. The in-shop store on the identical time is running on a number of factors just like the in-keep appearance and sense, cost added services and customer engagement to make sure clients are in the shop and buying. Retailers also are experimenting with modern advertising and advertising campaigns in particular through cellular telephones. These consist of launching buying apps, SMS signals at some point of sales and communication of cut price codes or coupons. Validating this strategy, seventy nine% of our respondents have admitted that **AT Kearney, 2015** might be happy to obtain offers or coupons through cellular telephones. For the physical save to preserve a competitive advantage, it will must preserve to reinvent itself in step with the converting instances. With expanded opposition even within the offline space, shops should pass beyond the "genuinely transacting" commercial enterprise version. It is vital that they offer customers with an experience that would persuade them that the new product would change their lifestyles. The trend of on-line outlets entering the physical area through beginning offline shops simplest emphasizes how multisensory patron stories contribute immensely in building lasting relationships with the consumer.

HYPOTHESES

Organized retail still faces running problem with government policy and competition from un-organized retail

THE RESEARCH PROBLEM

The main question about the study seeks to address about the behavior of various forms of organized retail versus to unorganized retail in reference to customer context. Empirical results in the field that relate to the problem above are based in a developed context (e.g. North America & Europe). As a result, understanding the pattern of business and customer taste and preference represents a hole in the field. Therefore, this study seeks to identify the key factors that determine the struggle of organized retail in Lucknow region.

It is expected that the result of this research will be to link the public more directly with companies which have production and export potential to encourage greater involvement and increased in the retail activity. The intended result was also to shed more light on the existing assumptions and behavior of private business practitioners in Lucknow.

RESEARCH METHODOLOGIES

To conduct a study one questionnaire was designed to know the perception of organized retail in lucknow. On the basis of the questionnaire, a set of hypothesis was formulated and tested. The reliability of the five point Likert scale used in the survey questionnaire was tested for internal consistency using the reliability coefficient Cronbach's alpha. The frequency and mean of response of consumers in the Likert scale was calculated. The quantitative data collected from respondents was analyzed using the Statistical Package for Social Sciences (SPSS). Chi-square was used for statistical data analysis

RESEARCH DESIGN

The descriptive research design is more structured and formal in nature. The aim of this design is to provide more comprehensive and detailed explanation of phenomenon under the study.

SOURCES OF INFORMATION

This is preliminarily an exploratory study with descriptive components. The data for fulfilling the objectives of the study have been collected from both secondary and primary sources as drawn round below:

- **Primary Data:** Primary research will be conducted in the Structured interviews will be conducted with the owners and senior entrepreneurs in MSME sector and other relevant stakeholders.
- **Secondary Data:** Data available from various State and Central Govt. Departments like Industries Commissionerate, State Industries Development Corporation, Directorate General of Foreign Trade, Trade Association & Bodies, Export Promotion Councils and Academic Institutions.

SAMPLING DESIGN

The opinion of Small & medium business units are collected across lucknow. These units are 55 respondents sole proprietorship, 154 respondents Partnership, 189 respondents Private Ltd., other 24 respondents involved in the subsector of the manufacturing of Food & Agro based products, chemical and chemical products. The opinions of respondents are collected from various locations of luckow.

TOOLS AND TECHNIQUES OF RESEARCH

Data Analysis and Interpretation

- Multiple Regression was used to explain the relationship between multiple independent variables and the Response variable.
- Primary data was collected by questionnaires and structured interviews to enable the testing of hypothesis.
- **Software Support:** Statistical Package for Social Sciences (SPSS) and Microsoft Excel will be primarily used for the purpose of data analysis.

HYPOTHESIS

H0: There is no significance difference amongst the various business structures with internal factors.

RESEARCH ANALYSIS

Table-1: Anova

Hypothesis	Factors	F-Value	Sign. Value	H1
H1	Owner decision influence the retail decision	1.234	0.37	Rejected
H2	Government Incentives influencing export decision.	6.325	0.035	Accepted
H3	Democratic Market affecting export initiation.	5.766	0.0001	Accepted
H4	Influence of Customer on Export Decision.	6.135	0.011	Accepted
H5	Foreign Market affecting export decision.	1.129	0.21	Rejected
H6	Local Market Influence on Export Decision.	2.591	0.041	Accepted

Sig. Value which is less than 0.05 which indicate that null hypothesis has to be rejected and alternate hypothesis should be accepted. Above table defined a significance difference among various types of the firms of 4 categories regarding different internal factors affect retail behavior. ANOVA shows the difference among group but Post-Hoc test can be used to understand homogeneity within groups. Post-Hoc test will derive where the differences among groups occur. Post-Hoc test suggests that three groups are evaluated than they are significantly different from one another. Partnership firms and Private Ltd. firms are significantly different than those of the other type of firms in the context of overall Parameters affecting retail development decision based on firm's experience, entrepreneurial traits influencing the local market decision, changes in foreign market affect export decision, overall customers influence the decision. Apart from these Other Firms are significantly different to one another in the context of overall entrepreneurial traits influencing the export decision, overall intermediaries influence your export decision, customers

RESEARCH FINDING:

Over all scenario in city presently

1 Real estate problem

The real estate costs organized retailers in India is 8-20% as in of Lucknow region this adversely affects the economics of organized retailers, especially the relatively smaller retailers. This is a result of a combination of several factors including the following:

- As the mot study done it show us that most Indian cities suffer from poor city planning that has not provided for enough commercial space especially Tier II an Tier III cities due to which high speculative prices are there in real state

- The stamp duty rates in India are among the highest in the world which is also implemented in Lucknow also with high fee for license and for other legal permission.
- Archaic laws like the Urban Land Control Ceiling and Regulation Act and the Rent Control Act complicate the usage of land and reduce transparency in transaction.

2 Undeveloped or improper malls

A large portion of malls has non standards developed or under construction, which are not designed keeping in mind the requirements of modern retail formats. In most cases, the mall space is sold to the highest bidder without considering the mix factor. As a result, there is a fair possibility that such malls may not become destinations of choice because of poor retailer mix. Changing the retailer mix to suit customers' requirements becomes a difficult task. As a result, such malls can fall out of favour with the customers

3 Poor and underdeveloped supply chain

Efficiencies in supply chain will determine the success of retailers for long term. The supply chain management need updating as its infrastructure in India is, however, still underdeveloped. This is because of lack of any proper investments by the existing retailers in developing robust supply chain. In India especially in Lucknow there is a very low level of automation in supply chain systems. The development of e-retailing has been a major boost for the supply chain but still there is little real-time link between suppliers, warehouses, and retail stores for conclusive impact. This result is leading to increased in delays and shortages of materials.

4 Taxation policies

India suffers from several back lock policy and taxation hurdles. If these issues are tackling effectively, there are chances for modern retailing that it could grow significantly. Non financing scheme on retail from banks make it difficult for retail sector to grow in an appropriate way if any amount is provided that has high interest rates, which ultimately pushes up capital costs. Approximately 39-55 different licenses are required to start a retail operation. This causes considerable delay in starting a new store operation. The government has allowed only 100% FDI in retail and that too in single brand retail. Further, talks to bring in FDI in multi-brand retail have met with open hands. These factors have **encouraged** the entry of foreign retailers into the country, who could have otherwise significantly contributed in improving the supply chain and level of technology usage in the sector. According to Pricewater house Coopers India Report Case Study, October 2014, India is the world's second-largest grower of fruit and vegetables. Foreign food retailers could do a great deal to help modernize India's agricultural sector in which some 30% of produce is lost because of the lack of efficient cold chains, logistics functions and continuing inadequate

5 Non proper human resources

The retail industry is based upon manpower intensive. Countries with high penetration of modern retail employ 10-12% of their workforce in retailing. India has large working population but still issue of proper working staff is there. This is because of absence of vocational training facilities for the organized retail sector. Most expert in industry feel that there is a significant shortfall of resources trained in retail specific skills sets which is need on floor, this include supply chain management, merchandising, vendor management, facilities management, customer relations, and branding of the brand. This has resulted in high attrition rates and rising people expenses, hindering aggressive ramp-up of most retailers. (anjali, et. al 2013) Training and retaining good staff for the store run and retail SOP's continues to be a major challenge for companies. This is because of fact that in India, there is an increasing lack of skilled workers needed for this sector. Although universities across countries produce millions of graduates every year, who are often not immediately employable by multi-nationals because of reason that they do not have the basic and operational skills necessary for corporate management jobs. This situation is pushing wages up as demand outstrips supply. One of the fundamental problems that their populations cannot be educated or trained quickly enough to keep up the phase with growing economy. Some institutions are developing their own training facilities to fill this gap like IIM and IIT's. An example of this which can be seen in China where company has set up its own university in China. The company's CEO in China, Steve Gilman, says, *"I could say that talent is among our biggest challenges"*. It would contribute both learning material and additional training for teachers also. In addition, foreign retail and consumer companies also collaborate with local leading universities on specific retail training programmes. (Mc Kinsey 2006/2007) A case in point is they way Tesco handled issues related to employment in Poland

- Tesco 20,000 new jobs since it entered the Polish market in 1995.
- 40% of its staff was previously unemployed.
- 11% are graduates for whom Tesco is their first employer

- Tesco Polska's talent development programme has been so successful that it is being used in the company's operations in other countries, including China, the Czech Republic and the UK.
- Tesco offers a comprehensive training programme to help new recruits develop the necessary management skills as fast as possible. (Pricewaterhouse Coopers Poland Report Case Study ,October 2006)

OPPORTUNITIES FOR ORGANIZE RETAIL IN CONTEXT WITH LUCKNOW REGION

In the past few years, Indian retail seen huge growth and many of new players had marked their presence. Retail in India emerged as one of the most fast paced industries in comparison to others. According to the FICCI-Ernst and Young 2007 report (Winning with Intelligent Supply Chains). "favorable demographics, steady economic growth, easy availability of credit, and large scale real estate developments were fuelling the growth of India's approximately USD 25 billion organized retail market". However recent recession had an impact on the Indian market. As per the Cartesian Economic Meltdown Survey 2008, almost all key industries in India have been negatively impacted by the slowdown and retail is no exception. Organized retail penetration in India, which had touch 27% by 2014 and expected to add 20% growth to present scenario (Global Retail Expansion-2015 pg 9). Retail sector is still on phase of growth, but investments made during the good time may make it difficult for retailers to declare their growth and profits. The KPMG Report, India Retail: A Time to Change Lane highlights the following;

- Although retailers in Lucknow are trying their best to convert the footfall into positive sale through constant promotional offers and deep discounts, consumers are expected to cut down on their discretionary variables which is making more time to let store to attend its Breakeven point.
- Falling sales and tough competition has lead to many big size business to cut their expenses and meet the bottom line for survival. However, with working capital requirements and expansion capital being financed through sizeable debt, interest costs have significantly dented the bottom-line.
- According to KPMG's report there was the investment of USD 55 billion over the next 4-5 years in organize retail. However delays in real estate development (retail) and opposition to organized retail policies has resulted in delays in investment.

This research has deal with some insights issues and challenges which would be helpful to managers of organized retail as well as owners of traditional formats, to address consumer demands better and provide services to them ensure repeat purchase. In Further the current research will help retailers in upcoming with new polices and CRM model. By this action retailer can choose the segment they want to target. Moreover, the findings will help retailers differentiate themselves such that they remain attractive to a large enough customer segment thereby remaining.

CONCLUSION

Retailer's success depend upon the retail format which determinants to their target customers. While selecting any format the retailer must consider some factors such as design of store, location, product and services they wish to provide to end user. The most important aspect is that the format should be ideal to their target demographics. The study conducted shows following conclusions –

- In India, retailing can be traced back in history by barter system, mela, hut shops, weekly markets and so on where goods are put on display by their vendors. Market saw emergence of kirana stores selling goods to consumers and providing convenience to end customer. Factors like increasing per capita spending by consumers, credit and debit cards usage, exposure of international tastes and lifestyles through live experience and by media etc. has led opening of growth for modern/organized retailing.
- Emergence of malls in India has added to the note that retail sector is florishing. There is lot of work to be done and also find new elements that can add drivers to development in retail landscape not only in the big cities but also to small ones. With the emergence of upper and middle class consumer base; there is now lot of opportunities in tier II and III cities. This means that there is major lion share yet to be achieved in retail. A big sphere of retail market is yet to be explored.
- The Indian retail market is one of the top five retail markets in the world having economic value of US\$ 450 billion and contributing 14 to 15 percent to nation GDP. It's the second largest employer after agriculture, having employed 35 million people and expected to generate 5.5 million employments.
- Retailer's success depend upon the retail format which determinants to their target customers. While selecting any format the retailer must consider some factors such as design of store, location, product and services they

wish to provide to end user. The most important aspect is that the format should be ideal to their target demographics

- Retailing is going in change of form from unorganized family owned businesses to organized modern retailing. Yet for their daily needs majority of consumers make purchase from general stores, road side vendors, weekly markets, melas on special occasions. At unorganized retail shop, customer gets easy credits for their small purchases.
- The organized formats had entered into the tier-II cities and other small cities by targeting middle class people. In the form of malls and modern retailing complex. Offering shopping with entertainment. But still kiranas continue over organized and modern formats.
- Organized retailing in Lucknow capture small portion of the total retail market. As showing signs of fast market capture emerging as one of the most fast paced industries with several players entering into the game. As a matter of fact retailing in India is gradually moving towards becoming the next boom industry.
- Due to Growth of personal disposable income there has been increased consumer spending capacity. The customer taste is changing from low price to high value with a motto of better shopping experience. With the concept of quick and easy loans, EMIs, loan through credit cards purchasing has become more feasible for Indian consumers.
- Major driver of globalization is foreign direct investments which has boost the growth of retail business and also hold accounts for over half and more than half of investment in retail sector. With high GDP growth in recent years has lead to increase in consumerism and liberalization, India has turn out to be an attractive destination for FDI in retailing. However, at present India currently allows 51% FDI in single-brand retail and 100% in cash-and-carry stores that can only sell to other retailers and businesses.
- In Lucknow the market has small number of organized players in retail, and is still at a developmental stage. The retail sector has seen leading Indian and foreign players who had investments in local market which has become a boom for industry at local market.
- Effective online monitoring and vigilance act is to be implemented for effective control on retail shrinkage. In basic terminology of retail “Retail shrinkage” is the variance between book and actual stock available in/at store. The major causes of retail shrinkage are”
 - a) employee theft
 - b) shoplifting
 - c) administrative errors
 - d) frauds by vendor
- Better enhancement of C.R.M and loyalty program are need to be implemented by retailers so that and edge over selling can be added which help to enhance sales also help in creating a better relation between customer and seller rather than normal sales cycle that is procuring of goods and delivering them to customers .
- Supply chain and Distribution is an essential and integral part of retail. Retail organization need to develop a proper distribution channels and system so that best results can be obtain on regular basis (this include efficient processes and delivering the right goods to the right place at the right time.)
- proper billing system need to be implemented by organized retailers and effective steps to improve POS service deliverance at the time of peak sales times keeping in mind to reduce queing problems, cash/card related problems for billing.
- Modern stores can offer a special feature of home delivery to retain customer as being practice by local kirana stores who offer both credit sales and home delivery

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WOMEN GRADUATE PERCEPTION TOWARDS ENTREPRENEURSHIP THROUGH SHG'S: A CASE STUDY

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ABSTRACT

Entrepreneurs play a key role in any economy. These are the people who have the skills and initiative necessary to take good new ideas to market and make the right decisions to make the idea profitable. The purpose of this paper is to examine the perception of women graduates towards a Entrepreneurship through self help group's with reference to Belthangady TQ. In this research paper primary data was collected from the fifty women graduate in the study area through questionnaire. Secondary data was collected from articles, books, periodicals and websites. An extensive literature review is done on women entrepreneur. The analysis of finding is based on relevant statistical tools. The findings states that Analysis of Variance (ANOVA) shows that there is a significant difference ($p < 0.001$, HS) in various components of women graduate perception towards Entrepreneurship through self help groups.

Keywords: women graduate, Entrepreneurship, Self help groups, rural development and women Entrepreneur.

INTRODUCTION

Development of entrepreneurship and entrepreneurship talent and skill are crucial for the developing economies like India. Especially when half of its population consists of women who have been restricted to the four walls of houses since centuries the major constraint for this backwardness is not economic in nature because the Indian government has taken a number of initiatives for encouraging women to play an active role in the economic development of the nation. It is the social perception of mal dominated society which has resulted in backwardness of women. They have always been given secondary role. The impact of this is that women in India .being deprived of a positive role in social and economic development of society and many of them are not ready to break traditional bondage. In many cases it is the self –imposed stupor of women which restricts them from engaging in economic activities.

The social, education and economic environment in India have undergone a sea change during the last two decades. With changing social structure and rising cost of living, the perception of society towards working women has changed, not only in urban but also in rural areas. There is a growing realization that both quality and quantity of women entrepreneurs is of utmost significance for achieving the goal of economic development.

OBJECTIVES OF THE STUDY

- To study the role of women entrepreneurs
- To study the development of women entrepreneurs through self help groups
- To give suggestions for development of women Entrepreneurship

REVIEW OF LITERATURE

Female Entrepreneurship is considered as an important tool in enabling female empowerment and emancipation. "Women entrepreneurs are defined as those who use their knowledge and resources to develop or create new business opportunities –whether this be informally in a home environment without formally registering their or formally via business registration, hiring office premises etc. According to Ganeshan G in their article he states that the increasing presence of women in the business field as entrepreneurs or business owners in the last decades as changed the demographic characteristics of entrepreneurs in India. Women-owned businesses are playing more active role in society and the economy inspiring academics to focus on this interesting phenomenon. Bhanumathi S has expressed the other faces of Indian Women entrepreneurship in recent phenomenon and in the process have to face various problems. The emergence of women entrepreneur and their contribution to the national economy is quite visible in India. The government of India has defined women entrepreneurs based women participation in equity and employment of a business enterprise. Women constitute the family which leads to society and family. Social and economic development of women is necessary for development of any country.

METHODOLOGY

This study was descriptive and analytical in nature. The study mainly depended upon the primary data to develop this article. However, same secondary sources of data were consulted for the purpose of gathering background information supporting the study. Relevant primary data were collected using the combination

quantitative (sample survey) and qualitative (interview) methods. Primary data were collected through questionnaire method. A Questionnaire was administered to 50 respondents of the study area. Appropriate and relevant statistical tools and techniques will be used such as Descriptive Statistics (Mean and S.D), Analysis of Variance (ANOVA). tools used for the study.

ANALYSIS OF DATA

Table-1: Criteria used for the Research Study

Class	0 - 25	25 - 50	50 - 75	75 -100
Perception of women graduate	Strongly disagree	Disagree	Agree	Strongly agree

Source: Likers scale

To Exhibits Women Graduate Perception towards Entrepreneurship through Self help group with Ten Points

Component	Strongly disagree	Disagree	Agree	Strongly agree	Mean and SD	Percentage Mean
1. Respondent opines that every member of SHG believes that SHG helps in improving living standards	1 (2%)	17 (34%)	25 (50%)	7 (14%)	2.7600±0.71600	69
2. Respondent opines that every member of self-help group aware about rules of SHG	6 (12%)	17 (34%)	22 (44%)	5 (10%)	2.5200±0.83885	63
3. Respondent opines that every member of self-help group aware about objectives of SHG	1 (2%)	19 (38%)	25 (50%)	5 (10%)	2.6800±0.68333	67
4 Respondent opines that every member of self-help group aware about bank loan	1 (2%)	9 (18%)	30 (60%)	10 (20%)	2.9800±0.68482	74.5
5 Respondent opines that every member of SHG seeks the benefit of bank loans	3 (6%)	17 (34%)	20 (40%)	10 (20%)	2.7400±0.85261	68.5
6 Respondent opines that every member of SHG became economically strong after they become member	0 (0%)	10 (20%)	30 (60%)	10 (20%)	3.0000±0.63888	75
7 Respondent opines that every member of SHG thinks positively on self-employment	0 (0%)	5 (10%)	30 (60%)	15 (30%)	3.2000±0.60609	80
8 Respondent opines that every member of SHG thinks to became economically independent	4 (8%)	21 (42%)	18 (36%)	7 (14%)	2.5600±0.83690	64
9 Respondent opines that every member of SHG thinks positively about capacity building and knowledge	3 (6%)	15 (30%)	29 (58%)	3 (6%)	2.6400±0.69282	66
10 Respondent opines that through SHG rural development is possible	1 (2%)	8 (16%)	26 (52%)	15 (30%)	3.1000±0.73540	77.5

Source: Survey data

FINDINGS OF THE STUDY**1. Respondent opines that every member of SHG believes that SHG helps in improving living standard**

2% of the respondents strongly disagree, 34% of them disagree, 50% of them agree, 14% of them strongly agree that SHG helps in improving living standard. "The percentage means 69 (Mean and SD 2.7600 ± 0.71600) shows that every member of SHG believes that SHG helps in improving living standard it falls in the category of 51% to 75%".

2. Respondent opines that every member of self-help group aware about rules SHG

12% of the respondents strongly disagree, 34% of them disagree, 44% of them agree, 10% of them strongly agree that every member of self-help group aware about rules of SHG (with Mean and SD 2.5200 ± 0.83885). "The percentage Mean 63 shows that every member of self-help group aware about rules of SHG as it falls in the category of 51% to 75%".

3. Respondent opines that every member of self-help group aware about objectives of SHG

2% of the respondents strongly disagree, 38% of them disagree, 50% of them agree, 10% of them strongly agree that every member of self-help group aware about objectives of SHG (with Mean and SD 2.6800 ± 0.68333). "The percentage Mean 67 shows that every member of self-help aware about objectives of SHG as it falls in the category of 51% to 75%".

4. Respondent opines that every member of self-help group aware about bank loan

2% of the respondents strongly disagree, 18% of them disagree, 60% of them agree, 20% of them strongly agree that every member of self-help group aware about bank loan. (with Mean and SD 2.9800 ± 0.68482). "The percentage Mean 74.5 shows that every member of self-help aware about bank loan as it falls in the category of 51% to 75%".

5. Respondent opines that every member of SHG seeks the benefit of bank loan

6% of the respondents strongly disagree, 34% of them disagree, 40% of them agree, 20% of them strongly agree that every member of SHG seeks the benefit of bank loan. (with Mean and SD 2.7400 ± 0.85261). The percentage Mean 68.5 shows that every member of SHG seeks the benefit of bank loans as it falls in the category of 51% to 75%".

6 Respondent opines that every member of SHG became economically strong after they become member

0% of the respondents strongly disagree, 20% of them disagree, 60% of the respondent agrees, 20% of them strongly agree that every member of SHG became economically strong after they became member of SHG. The percentage mean 75 (Mean and SD 3.0000 ± 0.63888), shows that every member of SHG became economically strong after they become member as it falls in the category of 51% to 75%.

7. Respondent opines that every member of SHG thinks positively on self-employment

0% of the respondents strongly disagree 10% of them disagree, 60% of them agree, 30% of them strongly agree that every member of SHG thinks positively on self employment (with Mean and SD (3.2000 ± 0.60609)). Percentage Mean 80%, which shows that very member of SHG thinks positively on self employment falls in the category of 76% to 100%.

8. Respondent opines that every member of SHG thinks to become economically independent

8% of the respondents strongly disagree, 42% of them disagree, 36% of them agree, 14% of them strongly agree that every member of SHG thinks to become economically independent (with Mean and SD 2.5600 ± 0.83690). The percentage Mean 64, which shows that every member of SHG thinks to become economically independent as falls in the category of 51% to 75%.

9. Respondent opines that every member of SHG thinks positively capacity building and knowledge

6% of the respondents strongly disagree, 30% of them disagree, 58% of them agree, 6% of them strongly agree that every member of SHG thinks positively about capacity building and knowledge. (with Mean and SD 2.6400 ± 0.69282). The percentage Mean 66, which shows that every member of SHG thinks positively regarding capacity building and knowledge as falls in the category of 51% to 75%.

10. Respondent opines that through SHG rural development is possible

2% of the respondents strongly disagree, 16% of them disagree, 52% of them agree, 30% of them strongly agree that through SHG rural development is possible. (with Mean and SD 3.1000 ± 0.73540). The percentage Mean 77.5%, which shows that through SHG rural development is possible as falls in the category of 76% to 100%.

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
Respondent opines that every member of SHG believes that SHG helps in improving living standards?	Between Groups	.485	3	.162	.302	.824
	Within Groups	24.635	46	.536		
	Total	25.120	49			
Respondent opines that every member of self-help group aware about rules of SHG?	Between Groups	2.309	3	.770	1.101	.358
	Within Groups	32.171	46	.699		
	Total	34.480	49			
Respondent opines that every member of self-help group aware about objectives of SHG?	Between Groups	3.936	3	1.312	3.185	.032
	Within Groups	18.944	46	.412		
	Total	22.880	49			
Respondent opines that every member of self-help group aware about bank loan?	Between Groups	5.266	3	1.755	4.558	.007
	Within Groups	17.714	46	.385		
	Total	22.980	49			
Respondent opines that every member of SHG seeks the benefit of bank loans?	Between Groups	3.176	3	1.059	1.501	.227
	Within Groups	32.444	46	.705		
	Total	35.620	49			
Respondent opines that every member of SHG became economically strong after they become member?	Between Groups	.833	3	.278	.667	.577
	Within Groups	19.167	46	.417		
	Total	20.000	49			
Respondent opines that every member of SHG thinks positively on self-employment?	Between Groups	2.056	3	.685	1.977	.131
	Within Groups	15.944	46	.347		
	Total	18.000	49			
Respondent opines that every member of SHG thinks to become economically independent?	Between Groups	1.945	3	.648	1.382	.260
	Within Groups	21.575	46	.469		
	Total	23.520	49			
Respondent opines that every member of SHG thinks positively capacity building and knowledge?	Between Groups	7.091	3	2.364	5.602	.002
	Within Groups	19.409	46	.422		
	Total	26.500	49			

Analysis of Variance (ANOVA) shows that there is a significant difference ($p < 0.001$, HS) in perception towards various components of women graduate towards Entrepreneurship through self help groups.

A. Suggestion for women's

1. Woman needs to realize their role and significance in family's upbringing and keeping family in an organized manner.
2. The mother should pass on this perception to her daughters and daughters to their daughters in a hierarchical manner.

B. Suggestions to men

The society need to realize the significance of women and should give them opportunities for growth and development as per their abilities and not as per tradition.

C. Suggestions to the government

The government has introduced a number of schemes for women development and women empowerment but many of these schemes remain on paper only and do not reach the real beneficiaries here the government should ensure their effective implementation.

CONCLUSION

It can be concluded from the analysis of secondary data and responses of the respondents during the survey that there is a strong perceptual changing society towards women and woman entrepreneurs in Indian society. However, this change is not reflected in the practice. The researcher feels that the Indian society is passing through a transition phase, where by the change in peoples "perception towards women will be reflected in their action over a period of time as the present generation way for new generation.

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USAGE OF TECHNOLOGY AND JOB SATISFACTION OF COLLEGE ACADEMIC FACULTY

Sunanda Sharma¹ and Dr. Raminder Pal Singh²Research Scholar¹, I. K. Gujral Punjab Technical University, KapurthalaAssociate Professor², Shaheed Bhagat Singh State Technical Campus (SBSSTC), Ferozepur**ABSTRACT**

Aim of the study: The objective of the research paper is to examine impact of modern technology and internet on the job satisfaction of college academic faculty.

Methodology: The research covered a group of 313 faculty members working in private and aided degree colleges in Malwa region of Punjab. The data was analyzed through ANOVA and t test in SPSS.

Findings: The research has shown that college academic faculty members, who use modern technology and internet, are significantly more satisfied than those teachers who do not use technology and internet while teaching.

Keywords: Job Satisfaction, Mode of Teaching, Usage of Technology and Internet

OPERATIONAL DEFINITIONS

Job Satisfaction: “Job Satisfaction refers to a person’s feeling towards specific dimensions of the work environment. It is positive feelings or attitudes that individuals have towards their jobs. When a person really likes his job, feels good and values his/ her job to great extent, job satisfaction arises.”

Modern Technology: “Modern Technology means usage of computer, multimedia, smart board, online teaching, online assignments or project reports, presentations with the help of computers, network hardware and software, satellite systems and various services and applications associated with them, such as video conferencing and distance learning etc.”

Internet usage: “Use of internet for academic purpose. It involves, internet surfing/navigation for getting extra knowledge, reading journals, e-books, lecture preparation, making study note for students and recent changes.

1. INTRODUCTION

Technology has huge importance in higher education. In modern era, expectations of students and society have changed as compare to traditional times. In higher educational institutes, teachers are expected to use different kinds of modern devices in teaching. Technology in education is defined as a collection of tools those are helpful in advancing students’ learning. Usage of technology in education is the ethical practice of facilitating e-learning, which is actually improving performance by creating, using and managing appropriate technological processes and resources. It saves time and efforts of the teachers. Usage of technology in education involves all kinds of modern media and materials for enhancing the learning and understanding. Technology has special place in education sector because it is helpful in imparting knowledge effectively and efficiently. In modern age, students are expected to use different modes and materials and to get learning experience from all sides. Teachers are expected to help, to guide and facilitate the students’ development. The teacher has to inspire and motivate the learners in their quest for knowledge and skills. Higher education is regarded as a process of interaction and interpersonal communication. Usage of technology in education is the ethical practice of facilitating e-learning, which is actually improving performance by creating, using and managing appropriate technological processes and resources. It is defined as a collection of tools which are helpful in advancing learning of students. According to Gaur and Shah (2014) information and communications technology includes any kind of communication device like, radio, television, cellular phones, computer, internet and network hardware and software, satellite systems etc. ICT also includes various services and applications associated with them, such as video conferencing and distance learning etc.

Some teachers are not familiar with usage of technology therefore; they use traditional method for teaching. As results, they are reducing their job satisfaction. In modern scenario, students want to use modern devices of technology and they expect help from teachers. “The Internet’s attractiveness has increased as a result of its availability, accessibility, and affordability” Amin (2012). So, educational institutes should make arrangements for training of their academic staff. Jansen (2010) said, “Online teaching and facilitation requires skills training of staff in this virtual environment”. Modern teaching methodology plays important role teaching learning process.

In present technological context, the use of information communication technology influences the teaching and learning behavior of teachers and students respectively to a great extent. According to Kumar Avnish (2010), teachers widely use information and communication technology. Generally they use word processor, spreadsheet and database applications, graphics program and internet. Technology has numerous advantages in the field of education, if it is implemented effectively. Modern technology is quite useful for teachers as well as students. Teachers' knowledge increases and students feel motivated by using ICT-enabled multimedia presentation and they become more creative by asking relevant questions from teachers. Teachers feel satisfaction from their teaching work when they use technology and further, job satisfaction leads to better job performance and effective teaching.

RESEARCH OBJECTIVES

The research paper has following objectives

1. To find out difference in job satisfaction of college academic faculty on the basis of using traditional technology i.e. chalk and talk method and using modern methodology while delivering lecture in class room.
2. To find out the difference in job satisfaction of college academic faculty on the basis of using internet or not using internet for academic purpose.

REVIEW OF LITERATURE

Ahmed (2009) explained in his study computers make the teaching and learning process more efficient. Computers can provide better learning results. Needs of students are fulfilled by using information and communication technology. Moreover, other skills like collaboration, critical evaluation, receiving feedback, planning and organization can be acquired by teachers. Desai (2010) did study and found that the role of ICTs in the education is recurring and unavoidable. There are swift changes in the technologies which are useful in the field of education. ICT also focuses modification of the role of teachers. In addition to classroom teaching, they will have other skills and responsibilities. Teachers must be efficient to teach modern students who use electronic media. Ultimately, the use of ICT enhances the learning experiences of students as well as teaching efficiency of teachers. Saha, Anop et. all (2014) did study and found that information and communication based education encourage to use multimedia, software, interactive courseware in imparting education to the students. Use of vedio, graph, diagram etc. makes the topic easily understandable. Furthermore, it was also discovered that ICT is also useful in socio economic development. In this study, significant differences were found among the students of ICT based and non-ICT based institutions. Ali, Nargis et.all. (2015) conducted survey in secondary schools in with a sample of 200 teachers and found that the secondary school teachers have a keen desire for the use of ICT and its integration within classroom environment. The use of ICT brings changes in modern societies. Technological aids play a convenient role in the teaching. It improves teaching learning process. It is derived from the findings of the study; government should replace the traditional teaching aids by new technologies for the better teaching and learning. Bulman and Fairlie (2015) discussed that time and money spend on using computers, software, the Internet and other technologies is beneficial than expenditures on other educational inputs or may be less efficient. New technologies may displace other more effective instructional and learning methods and distract schoolchildren, or they may represent an effective learning tool and engage schoolchildren in learning.

Camilleri and Camilleri (2016) found in their study that younger teachers were increasingly engaging in digital learning resources and it happened more useful for teachers as well as students. Akpabio and Ogiriki (2017) stated in their study that information and communication technology has great role in enhancing teachers' efficiency and teaching skills.

RESEARCH METHODOLOGY

Data was collected through Stratified sampling technique. Sample was comprised from 313 academic faculties of private and aided degree colleges in Malwa Region of Punjab. Malwa region of Punjab includes 14 districts (Barnala, Bathinda, Faridkot, Fazilka, Ferozepur, Ludhiana, Mansa, Moga, Mohali, Muktsar, Patiala, Parts of Fatehgarh Sahib, Ropar and Sangrur). Standardized scale developed by Amar Singh and T R Sharma (1986) and interview schedule based on Academic Performance Indicator of UGC. There were six dimensions of the scale (Job itself, supervision, colleagues, salary, work condition and promotion). The data was analyzed through ANOVA and t test in SPSS software.

DATA ANALYSIS AND INTERPRETATION

Table1. Percentage of College Academic Faculty on the basis of Usage of Modern Technology and Internet while Delivering Lectures

Sr. No.	Category		N	Percentage
1	Mode of Teaching	Chalk and Talk Method only	161	51.4%
		Using Modern Technology	152	48.6%
2	Usage of Internet	Not Internet user	58	18.5%
		Internet User	255	81.5%

This table shows that 51.40% college academic faculty use chalk and talk methodology for teaching. 48.60% college academic faculty use modern technology, while delivering lecture. Further, 81.50% academic faculty use internet for academic purpose and 18.50% academic faculty do not use internet for academic purpose while delivering lectures. They use internet for lecture preparation, searching study material. Methodology used by academic faculty can be seen in Figure1, graphically.

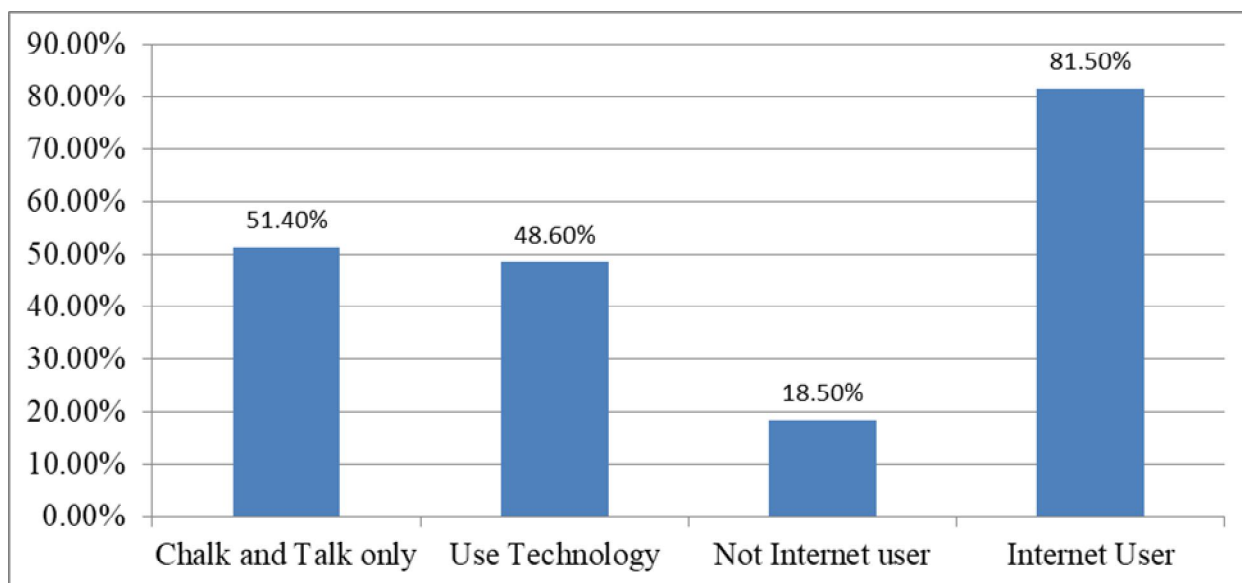


Figure-1: Percentage of academic faculty on the mode of teaching (Chalk and talk method and usage of technology) and on the basis of using internet (Internet user and non internet user while delivering the lectures).

Table: 2 Significance of mean difference in Job Satisfaction of College Academic Faculty on the basis of Mode of Teaching (Chalk and Talk method and Use of Modern Technology) and on the basis of usage of internet for academic purpose (Internet User and not internet User)

Sr. No.	Category		N	Mean	Std. Deviation	Std. Error Difference	t	Sig.
1	Mode of Teaching	Chalk and Talk Method	161	88.88	13.823	1.44	5.09	.001
		Use of Modern Technology	152	96.24	11.593			
2	Usage of Internet for academic purpose	Not Internet User	58	78.83	14.354	1.69	9.91	.001
		Internet User	255	95.56	10.892			

1. The t value for mean difference in job satisfaction between college academic faculties who use chalk and talk method and who use modern technology is 5.09, which is significant at .01 levels. It means, there is significant difference in job satisfaction of college academic faculty on the basis different methodology of teaching (chalk and talk method and usage of technology). Further, mean score of job satisfaction of college academic faculty who use technology (96.24) is more than mean score of job satisfaction of those faculty members who use only chalk and talk method (88.88). It is clear from above table that, college academic faculty who use technology in delivering lecture have significantly higher job satisfaction than faculty using only chalk and talk method in lecture.
2. The t value for mean difference in job satisfaction between college academic faculty who use internet for academic purpose and faculty who do not use internet for academic purpose is 9.91, which is significant at .01 levels. It means, there is significant difference in job satisfaction of college academic faculty on the basis usage of internet for academic purpose. Further, mean score of job satisfaction of college academic faculty

members who use internet (95.56) is more than mean score of job satisfaction of faculty members not using internet for the academic purpose (78.83). It means, academic faculties who use internet for academic purpose have significantly higher job satisfaction than faculty not using internet for academic purpose.

Significance of mean difference in job satisfaction on the basis of mode of teaching (Chalk and Talk method and use of technology) and significance of mean difference in job satisfaction of college academic faculty on the basis of usage of internet for academic purpose (Internet User and not internet User) can be seen in figure 2

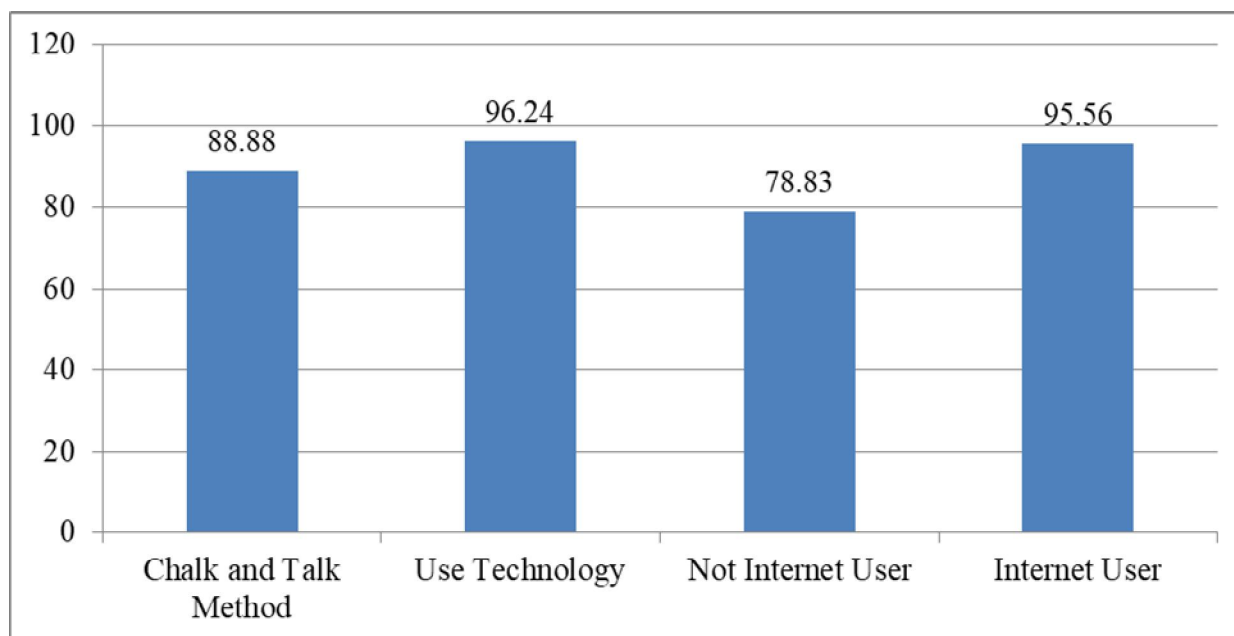


Figure-2: Significance of mean difference in job satisfaction of college academic faculty on the basis of mode of teaching (Chalk and Talk method and Use of Technology) and on the basis of usage of internet for academic purpose (Internet User and not internet User)

RESEARCH FINDINGS

1. It is clear from above table that, college academic faculty who use modern technology in delivering lecture have significantly higher job satisfaction than faculty using only chalk and talk method in lecture.
2. Academic faculties who use internet for academic purpose have significantly higher job satisfaction than faculty not using internet for academic purpose.

CONCLUSION

It can be concluded that information and communication technology has great importance in education sector. It has positive impact on teaching style of teachers. College academic faculty members who use technology in delivering lecture have significantly higher job satisfaction than college teachers who use only traditional methodology like chalk and talk method while delivering lecture. In addition to this, academic faculty members who use internet for academic purpose have significantly higher job satisfaction than those faculty members not using internet for academic purpose. Use of internet, multimedia, smart board, online teaching, online assignments, making project reports and presentations with the help of computers are the sources of job satisfaction of college teachers. These technological devices save time and enhance efficiency of academic staff members. It is recommended that college management must encourage teachers to use information and communication technology for increasing job satisfaction and teaching efficiency. Academic faculty members must be provided training when required.

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EFFECTIVENESS OF E-CONTENT ON NUCLEAR PHYSICS FOR HIGHER SECONDARY STUDENTS

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ABSTRACT

The main objectives of the study were to found out the effectiveness of e-content developed by the investigator in the unit NUCLEAR PHYSICS of higher secondary second year syllabus under Tamilnadu State Board on the academic achievement of higher secondary second year students and to found out the significant difference between the study variables with respect to levels of learning such as Knowledge, Understanding & Application. Experimental method was used for the study. The sample consists of 64 higher secondary second year students selected purposely from Subbiah Vidyalayam Girls Hr. Sec. School, Thoothukudi who learn Physics as one of their main subjects in English medium. Two tools namely Achievement Test developed and standardized by the investigator and Assessment Tool for Multimedia have been used in this study. In the pre-test, no significant difference was found in the achievement mean scores between control group and experimental group irrespective of the level of learning. In the post-test, the experimental group performed better than the control group. This better performance of the experimental group shows the effectiveness of e-content compared to traditional method. Significant difference was observed in the gain scores of the sample groups. The retention test scores shows that the retention scores for experimental group taught through e-content was better than that of control group taught through conventional method. Finally, the study revealed that e-content developed by the investigator on the unit NUCLEAR PHYSICS was found to be effective to make higher secondary second year students score higher in their examinations.

Keywords: E-content, Nuclear Physics, Multimedia, Higher Secondary Physics, Experimental study

INTRODUCTION

The paradigm shift in the process of teaching and learning from the traditional methods to the modern technopedagogical approaches in the milieu of classroom is being promoted rapidly in realm of education everywhere in the world in the 21st century. Technology makes a significant contribution to education. This gift of technology helps the modern educators to bestow an enriched teaching and learning; helps to raise levels of attainment; and closes the attainment gap. Technology plays the role of taking the classroom and the students into the emerging trend. Technology has expanded from use primarily as an instructional delivery medium to an integral part of the learning environment. The skillful deployment of digital technology in schools and early learning settings will ensure the learners develop many digital skills. Technology associated learning does not seek to replace traditional teaching and learning, but are expected to supplement them.

LEARNERS, TEACHERS AND TECHNOLOGY

In today's world, many students are intertwined to technology. This enables them to have a 24×7 mobile access to information and sources, develop a multimedia content and share them with the world. Learners of digital age are believed to be Net Generation, their milieu is challenging because of their social involvement with technologies, and so teachers need to learn more about integrating technological tools like podcasting, simulation, blogging, Wikipedia, online instruction, Twitter, Digg, and mobile learning. Learning how to integrate technology and using them will help in blending with the background of learners in the classroom environment. Additionally, teaching will become more organized, less time wastage, effective, and efficient. Learners will ultimately be motivated to learn and understand through familiar technologies.

As the need for technology's presence in the classroom increases, teachers are more likely to stay with their pedagogical beliefs about teaching with technology. But teachers with their limited training and relatively superficial curricula, most likely would have found the implementation of technology quite challenging. Their attitude towards technology must be fostered via in-service training. When teachers practice and test new strategies for mediating technology-based learning, which will in-turn revolutionize the pedagogical development (Hennessy *et al.*, 2007).

E-LEARNING & E-CONTENT

There are many methods in individualized instruction, viz., Assignment, Learner Controlled Instruction, Programmed Instruction, Personalized System of Instruction, Computer Assisted Instruction, etc. The recent method of individualized instruction in the field of education is 'e-learning'. The National Policy on Education (NPE: 1986) has accentuated the application of Educational Technology to enhance the quality of education at

all levels. It has also laid a special emphasis on using computers in the teaching-learning process. The rapid proliferation in the computer technology paved the way for the introduction of computers and also the development of e-content for teaching and learning. E-learning is a process and e-content is a product. E-content is very convenient for training students; provides self-pacing facility to every learner; engages users with interactivity; and accesses quick reference materials.

E-content is digital information delivered over network-based electronic devices, i.e. symbols that can be utilized and interpreted by human actors during communication processes, which allow them to share visions and influence each other's knowledge, attitudes or behaviour. It allows for user involvement and may change dynamically according to the user's behaviour.

NEED FOR THE STUDY

Technology offers a number of ways to make teaching-learning interesting and individualized. E-content is one among them. It can cater to the needs of the learners and allow them to proceed at their own pace. Teachers are in a position to develop e-content for facilitating their wards learn their subjects easily, effectively and interestingly at any time. It is only when teachers make an effort to develop an e-content, the potential benefits of teaching will be high. The teachers can develop an e-content for a difficult topic in such a way that it can help any mediocre student to comprehend the subject and depend on autonomous learning. Considering all the above, the investigator being a teacher educator made an attempt to develop an e-content for the unit "Nuclear Physics" in the XII standard of Tamilnadu State Board Syllabus.

RESEARCH OBJECTIVES

The following are the objectives of the present study.

1. To develop the e-content modules for learning the unit nuclear physics at the higher secondary level.
2. To find out the effectiveness of e-content modules in learning the unit nuclear physics among higher secondary students.
3. To find out the significant difference if any, between Control group and the Experimental group in their
 - (i) Pre-test Mean Achievement Scores
 - (ii) Post-test Mean Achievement Scores
 - (iii) Pre-test Post-test Mean Achievement Scores
 - (iv) Gain Mean Achievement Scores
 - (v) Retention Mean Achievement Scores grouped on the basis of knowledge, understanding and application levels of learning.

HYPOTHESES OF THE STUDY

The following are the hypotheses formulated affirmatively for the present study.

1. There is significant difference among the Pre-test Mean Achievement Scores of Control group and Experimental group classified on the basis of knowledge, understanding and application levels of learning.
2. There is significant difference among the Post-test Mean Achievement Scores of Control group and Experimental group classified on the basis of knowledge, understanding and application levels of learning.
3. There is significant difference between Pre-test and Post-test Mean Achievement Scores of Control group and Experimental group.
4. There is significant difference between the Gain Mean Achievement Scores of Control group and the Experimental group classified on the basis of knowledge, understanding and application levels of learning.
5. There is significant difference between the Retention Mean Achievement Scores of Control group and the Experimental group classified on the basis of knowledge, understanding and application levels of learning.

For statistical purposes these hypotheses were converted into null form and the calculations were carried out.

LITERATURE REVIEW

The reviews related to e-learning, e-content and achievement in Physics have been collected and examined to gain a greater understanding of the research problem. Some reviewed studies on e-learning focused on aspects of e-learning like development of an e-learning material, creating an e-learning platform, comparison of e-learning tools, attitude towards e-learning and testing the effectiveness of e-learning modules. A few studies focused on personalizing e-learning by considering learning style preferences and background of learners.

Other studies explored variables like e-mentoring, organizational learning environment, individual differences, and internet use behavior and study culture in relation to e-learning.

The findings in the reviewed studies helped to conceptualize different facets of e-learning. Chiang and Lan (2014) proved that e-learning modules could be successfully developed using ADDIE instructional model. A similar finding has been recorded by Yu et al (2010) who found that the sports e-learning platform designed on the basis of ADDIE instructional model was useful to coaches to teach physical motions and exercise rules. The study by Mishra et al (2017) revealed that e-learning module was effective in enhancing the knowledge of student nurses. Murari et al (2016) recorded that the usability evaluation score denoted a strong agreement among agriculture researchers about the effectiveness of e-module with respect to aspects like content, support, visual design, navigation, interactivity, self-assessment and learnability. A similar finding has been reported by Moreira et al (2015) who reported that e-learning course for radiographers was effective and 85% of the learners were satisfied with the course. Some insights have been gained with regard to the nature of e-learning tools in terms of their perceived usefulness. Hsieh and Cho (2011) found the "Student Interactive" e-learning tools outperformed "Self-Paced" e-learning tools in the perceived usefulness, satisfaction and learning outcome. Madhumita and Mishra (2017) found that e-mail was the most frequently used e-learning tool (73.3%) by students, followed by facebook (60%) and Youtube (56.6%). Borkoukon (2016) found that the system of personalized teaching strategy showed effectiveness fitting with the learners learning styles. Alizade (2014) recorded that there is a significant relationship between e-learning and study culture of university students. Some interesting observations have been made with regard to student's attitudes towards e-learning. Elnoor et al (2017) found that 90% of post graduate veterinary students possessed favourable attitude towards the use of e-learning tools. Mc Cann et al (2010) found that 64% of dental hygiene students preferred printed text over digital and 74% wanted e-materials to supplement but not replace lectures.

The reviews of studies on e-content help to understand the areas in which e-content have been successfully developed, the effectiveness of e-content, the challenges in developing e-content, readiness to use e-content for learning and interactive elements in e-content. Some studies have focused on emerging trends in e-content like e-consenting through e-content, recommendation systems for e-content and e-content management. Some of the topics for which e-content have been developed are Atomic Structure, Cloning, Miro teaching skills, Disaster Management, French Revolution and "p-block elements".

The reviewed studies helped the investigator to know some major findings related to e-content. Tamil Selvan et al (2013) found that engineering students have a high level of willingness to learn online and that they need materials that are not boring. Dilek (2010) found that interactive elements like simulation environment with web-based education can be a solution to shortage of tools, space and staff for teaching purposes. Juhary (2010) reported that lack of ICT and e-learning policy, uncertainty of ownership for e-learning are some of the challenges in developing e-content. The studies that tested the effectiveness of e-content have similar findings. Subramanian and Ramakrishnan (2017), Amutha (2016), Lakshmi et al (2016), Vasuki et al (2014) and Kannan and Muthumanickam (2010) have reported that e-content was effective than traditional methods of teaching.

The reviewed studies on Physics achievement focused on related components like approaches to learning Physics, technology for teaching Physics, utilization of e-resources for learning Physics, learning styles, study habits, self-concept and language for learning Physics. The reviewed studies discussed the Physics achievement of a wide range of learners like senior secondary school students, college students, university students and research scholars.

Some of the findings in the reviewed studies help the investigator to comprehend the different aspects of achievement in Physics. Sezgin (2014) found that there were significant differences between the students' approaches to learning Physics according to the variable of achievement. Rachel (2012) found that first year University students of advanced streams reported higher levels of deep approaches while those of fundamental streams reported higher levels of surface approaches. Aditya et al (2012) found that computer simulation approach was helpful to model and solve problems in "thermodynamics". Sardesai (2012) recommended on the basis of his findings that Physics should be taught in a more attractive thought provoking manner using simulations, animations and presentations rather than using dry and dull mathematical definitions. A similar observation has been made by Bajpai (2012) who found that students learned concepts of photoelectric effect through virtual lab in a better way as compared to real lab. Mohd and Moheeta (2016) found that male students speculated high attainment in Physics than female students. Kandilinger (2015) reported that "diverging learning style" was preferred by pre-service Physics teachers. Efren and Grace (2015) found that students taught in diaglossic language gained a higher level of Physics achievement and understood better the Physics concepts compared to students taught in pure English language.

Many of the reviewed studies have helped the investigator to develop the e-content for a topic in Physics. The effectiveness of ADDIE model and the need for interactive elements have been affirmed in the reviewed studies and have encouraged the investigator to incorporate them in her e-content. A closer look at the studies done abroad has made the investigator realize that personalizing the e-learning environment is an emerging trend in e-learning. The studies on e-content and e-learning in India are comparatively lesser in number. This has encouraged the researcher to explore areas for e-content development. The reviewed studies have shown that e-content has been developed to teach concepts that are challenging to teach in the traditional way. All the above considerations have led the researcher to frame a research that would address the need to develop e-content to teach a “difficult to teach” topic in her area of specialization namely Physics.

RESEARCH METHODOLOGY

In the present study, the investigator has employed the Pre-test - Post-test Equivalent Group Design. In this design, subjects are assigned to the experimental and control groups by random procedures and administered a pre-test. The experimenter introduces the treatment only to the experimental group and conventional method to the control group. The control group was given the lecture method i.e. the chalk and talk method of teaching and the experimental group was taught using e-content to find out its effectiveness in learning Nuclear Physics. In the end, the post-test is administered. The difference between the means of pre-test and post-test mean achievement scores are found out for each group and these mean differences of the scores are compared with the help of an appropriate statistical test in order to ascertain whether the experimental treatment has produced a significant effect than the control condition.

RESEARCH INSTRUMENTS USED

To carry on this study successfully the researcher has used the following instruments:

- Non-Verbal Intelligence Test developed by Atmananda Sharma (2009)
- Assessment Tool for Digital Content (Multimedia) given by the Central Institute of Educational Technology, MHRD (2010) issued by NCERT, Government of India.
- Achievement Test developed and validated by the Investigator and the Research Supervisor (2017) based on Knowledge, Comprehension and Application levels of learning.

DATA ANALYSIS & RESEARCH FINDINGS

One-way ANOVA is the statistical technique employed for the analysis of data to arrive at conclusions in this study.

H1. There is no significant difference among the pre-test mean achievement scores of control group and experimental group classified on the basis of knowledge, understanding and application levels of learning.

Table-1: Difference among the pre-test mean achievement scores of control group and experimental group classified on the basis of knowledge, understanding and application levels of learning

Group	Level of Learning	N	M	S.D.	F value	'p' value	Remarks
Control	Knowledge	32	6.47	2.639	0.629	0.535	NS
	Understanding	32	6.28	2.113			
	Application	32	5.88	1.621			
Experimental	Knowledge	32	6.41	2.046	2.341	0.102	NS
	Understanding	32	5.59	1.982			
	Application	32	5.47	1.582			

Note. NS = Not Significant.

In the above table, since p-value is greater than 0.05, the null hypothesis is accepted at 5% level of significance. Hence, it is concluded that there is no significant difference among the pre-test mean achievement scores of control group and experimental group classified on the basis of knowledge, understanding and application levels of learning.

H2. There is no significant difference among the post-test mean achievement scores of control group and experimental group classified on the basis of knowledge, understanding and application levels of learning.

Table-2: Difference among the post-test mean achievement scores of control group and experimental group classified on the basis of knowledge, understanding and application levels of learning

Group	Level of Learning	N	M	S.D.	F value	'p' value	Remarks
Control	Knowledge	32	9.19	1.091	1.962	0.146	NS
	Understanding	32	8.81	0.738			
	Application	32	8.50	2.016			
Experimental	Knowledge	32	11.19	1.789	151.8	0.000**	S
	Understanding	32	16.59	0.712			
	Application	32	9.03	2.429			

Note. NS = Not Significant

For control group, since p-value is greater than 0.05, the null hypothesis is accepted at 5% level of significance. For experimental group, since p-value is lesser than 0.01, the null hypothesis is rejected at 1% level of significance. Hence, it is concluded that there is no significant difference among the post-test mean achievement scores of control group but there is significant difference among the post-test mean achievement scores of experimental group classified on the basis of knowledge, understanding and application levels of learning.

H3. There is no significant difference between pre-test and post-test mean achievement scores of control group and experimental group.

Table-3: Difference between pre-test and post-test mean achievement scores of control group and experimental group.

Group	Scores	N	M	S.D.	't'	'p' value	Remarks
Control	Pre-test	32	18.63	4.910	12.389	0.000**	S
	Post-test	32	31.94	3.583			
Experimental	Pre-test	32	17.69	4.908	18.066	0.000**	S
	Post-test	32	36.81	3.431			

Note. S = Significant.

In the above tables, since p-values of both control and experimental group are lesser than 0.01, the null hypotheses are rejected at 1% level of significance. Hence, it is concluded that there is significant difference between pre-test and post-test mean achievement scores of control and experimental group.

H4. There is no significant difference between the control group and the experimental group in their gain mean achievement scores classified on the basis of knowledge, understanding and application levels of learning.

Table-4: Difference between the control group and the experimental group in their gain mean achievement scores classified on the basis of knowledge, understanding and application levels of learning

Level of Learning	Group	N	M	S.D.	F value	'p' value	Remarks
Knowledge	Control	32	4.50	2.000	3.820	0.025*	S
Understanding		32	5.38	2.366			
Application		32	3.84	2.288			
Knowledge	Experimental	32	4.22	2.310	70.461	0.000**	S
Understanding		32	10.88	2.637			
Application		32	4.41	2.698			

Note. * = Significant at 5% level, ** = Significant at 1% level.

In the above table, since p-value is lesser than 0.01, the null hypothesis is rejected at 1% level of significance for experimental group whereas for control group since P value is lesser than 0.05, the null hypothesis is rejected at 5% level of significance. Hence, it is concluded that there is significant difference between the control group and the experimental group in their gain mean achievement scores classified on the basis of knowledge, understanding and application levels of learning.

H5. There is no significant difference between the control group and the experimental group in their retention mean achievement scores classified on the basis of knowledge, understanding and application levels of learning.

Table-5: Difference between the control group and the experimental group in their retention mean achievement scores classified on the basis of knowledge, understanding and application levels of learning

Level of Learning	Group	N	M	S.D.	F value	'p' value	Remarks
Knowledge	Control	32	9.44	2.257	1.689	0.190 ^{NS}	NS
Understanding		32	9.94	1.917			
Application		32	8.91	2.519			
Knowledge	Experimental	32	10.47	2.094	163.827	0.000**	S
Understanding		32	16.00	0.672			
Application		32	7.63	2.406			

Note. * = Significant at 5% level, ** = Significant at 1% level.

In the above table, the p-value for control group is greater than 0.05 and for the experimental group is lesser than 0.01. Hence it is concluded that there is no significant difference in the retention scores of the control group classified on the basis of levels of learning and significant difference exists in the retention mean achievement scores of the experimental group classified on the basis of knowledge, understanding and application levels of learning.

INTERPRETATION AND DISCUSSION

In this study, both the sample groups namely control group taught by conventional method and experimental group taught through e-content were equivalent in terms of the intelligence test scores. The pre-test scores indicated that both the sample groups were equivalent in their intelligence scores prior to experimentation which showed their homogeneity. The experimental group performed better than the control group in the post- test. This implies that the treatment through e-content has proved to be effective than the conventional method in learning the unit Nuclear Physics.

It is also found that there is significant difference among the overall gain scores of the sample groups. Moreover the gain scores of the control group is found to be significant at 5% level with regard to the cognitive level. This shows that the understanding level may be improved through conventional method easily. It is also inferred that no method may be considered to be less effective and the effectiveness of any method depends heavily on the teacher who applies it. When taught through e-content, both the knowledge and the understanding level were found to have improved than the application level. This might be due to the fact that the contents covered in the unit Nuclear Physics under Tamilnadu State Board syllabus did not contain many application level contents compared to knowledge and understanding level.

The experimental group retained the knowledge better than the control group which was evident from their delayed post-test scores. It is thus inferred that multimedia contents when embedded in the teaching of abstract concepts like Nuclear Physics can be more effective to retain the knowledge in the classroom situation.

CONCLUSION

E-content development is the heart of teaching learning process. Although content development plays a key role in e-learning, it is undoubtedly not an easy process. It requires expert knowledge in the subject area, patience in creating the necessary objects that make up quality and a high sense of creativity in structuring and sequencing the topics to make a complete whole. From this it is predicted that e-content production enriches the e-learning in a dynamic way. It is said that people are visual minded. They retain 20% of what they hear. 50% of what they hear and see. And probably, 100% of what they hear and see and do. This is what e-contents are poised to do and what e-contents are intended for.

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EMERGING TRENDS IN ELECTRICAL WHOLESALING DUE TO IMPACT OF E-COMMERCE - A THEORETICAL FRAMEWORK FOR SUCCESSFUL ADAPTATION

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ABSTRACT

This paper looks at the electrical wholesale business and the emerging trends due to the rapid inroads of e-commerce in the B2B segment.

The e-commerce segment also needs to adapt its strategy for the B2B segment, which is very different from the regular B2C retail business. E-commerce giants are working overtime to address this requirement and could become successful in gaining market share from regular electrical wholesalers.

E-commerce has made a severe impact on brick and mortar selling in the retail industry and many small businesses have gone bankrupt due to this transformation of buyer's habits. Electrical wholesalers have to be aware and ready for this disruptive change approaching them. A SWOT analysis of electrical wholesalers has been performed, and the researcher develops a theoretical framework and an approach to e-commerce through building blocks. This Building block approach can be useful to implement and stay relevant in the changing distribution landscape.

Keywords: SWOT Analysis, Theoretical Framework, Building Block Approach

INTRODUCTION

E-commerce is a disruptive market evolution that is quickly engulfing the world. It has made deep inroads into the retail selling and the business-to-consumer (B2C) segments and is rapidly evolving in the business-to-business (B2B) segment.

There is a prediction that B2B e-commerce will dwarf B2C sales in a few years from now. B2B e-commerce is expected to be around 1.2 trillion USD by 2021, as per Forrester research report of 2017. Another estimate about B2B commerce by Frost & Sullivan is more bullish at 6.6 trillion USD by 2020.

However, the adaptation of the B2B segment has been slow. The wholesale electrical segment especially has been having a slow start due to the complexities involved in launching a customer friendly e-commerce platform, due to the technical nature of products and the number of line items. The amount of technical information to be provided before a buyer finalises their purchase is quite high. To resolve this, various global electrical manufacturers have come together and formed a group to work on creating a classification model called ETIM, which will be a universal platform used by global manufacturers to upload and update their product information.

However, the progress has been slow. However, some of the developed countries are rapidly adapting to the purchase of electrical goods online.

This will result in significant impacts on the business of electrical wholesalers. The purpose of this paper is to analyse the variety of information available to come up with an acceptable framework, which can guide electrical wholesalers.

After re the available literature on the topic, the author performs a SWOT analysis of electrical wholesalers and develops a theoretical framework, and builds a building block approach to e-commerce for electrical wholesalers to implement and stay relevant in the changing distribution landscape.

REVIEW OF LITERATURE

BERLIN GARCHING, 2016, Electrical Wholesaler study 2016, This is an elaborate study on electrical wholesaler business in the year 2016, especially concerning the technology disruption and market evolution due to e-commerce, which is similar in approach. However, the research focuses on lighting products and does not cover the implications and road map for firms to enter e-commerce. Regardless, it is an informative and comprehensive study on challenges faced by electrical wholesalers concerning the lighting business with possible recommendations to navigate the challenges.

digitalcommerce360.com – 2018, Many-electrical-distributors-remain-off-the-grid-for-e-commerce. This is a web article on the fate of e-commerce in electrical wholesalers. It is based on research by APURVA, which concludes that larger wholesalers have a presence in e-commerce while smaller firms still lag.

W.W. Grainger Inc. ranks number one among electrical wholesalers with a score of 245 against a possible highest score of 300. Rexel ranks second with a score of 226.4; Rexel is a French group, which has 2000 branches in 26 countries. In third is Global Industrial, a Systemax group company, ranking 215.

The research confirms that 93% of B2B buyers prefer to shop online once they are clear as to their requirements. This is advantageous for e-commerce enabled firms in winning such business.

E-Commerce Checklist for Electrical Wholesalers – Article by Hybris Software. This SAP Company article details a checklist for electrical wholesalers for setting up an e-commerce website.

It advises electrical wholesalers to embrace multi-channel e-commerce strategies that will enhance their printed catalogues, websites and showroom offerings. The paper argues that customers expect a consumer-like online experience and encourages companies to include product images, reviews from previous buyers and videos to enhance customer appeal, and to categorise products based on their application instead of product names.

It also recommends an easy-to-use customer interface and a mobile-based app to encourage ordering by electricians from the site. It recommends a checklist for electrical wholesalers to help them increase their e-commerce deals.

greenlightdigital.com 2018. The article lists the top ten limitations of e-commerce websites that electrical wholesalers should focus on to achieve success. These include real-time customer-specific pricing, quick order, reorder, auto-replenishment, bundle and tired pricing, future stock availability, customer self-service. This will serve as a guide to new firms entering e-commerce.

Eid Riyadh et al., 2006. This paper discusses a theoretical framework for international internet marketing. It analyses three firms and identifies four factors having a significant impact on international internet marketing, namely market strategy factors, internal factors, website design factors, and market factors. The paper lacks depth in any specific industry and is a general discussion about the developments in the B2B e-commerce world.

Foer Albert, 2001. This paper on e-commerce discusses how the legal framework will support the early phase of e-commerce internationally and how copyrights and antitrust laws will be implemented in this borderless commerce of internet marketing.

Gregory Gary, 2007. E-commerce has had a significant effect on export marketing. The author demonstrates this by testing a theoretical model and proves how e-commerce drivers affect export marketing strategy. The study suggests that e-commerce drivers, namely product online transferability and e-commerce assets, directly improve distribution efficiencies. The study strongly supports incorporating e-commerce into the export marketing strategy.

Ekeledo Ikechi et al., 2004. This paper suggests a model for the entry of service-oriented firms into e-commerce. It is a conceptual paper about e-commerce, service marketing, and foreign entry mode choice. The authors suggest various research propositions, managerial implications, and suggestions of empirical research on the topic.

Sismeiro Catarina et al., 2004. This is an interesting article on interpreting the buying behaviour of online customers. It studies the buying behaviour of those who browse the website, and how this browsing behaviour can predict the success of the deal. It also demonstrates that having highly sophisticated decision aids do not necessarily help the purchase decision and that the number of repeat visits to the site does not guarantee a definite purchase. This necessitates website managers to design a site that can help the conversion of online customers into real buyers.

ELECTRICAL WHOLESALERS

E-commerce has been a significant market disruptor in the retail segment and now will become one in the B2B segment, which will, therefore, affect the electrical wholesaler segment as well.

E-commerce has made many retail businesses bankrupt. It has been termed as a severe threat of brick and mortar showroom and retail selling. It has the potential to uproot many long-time players out of the business if they are not sufficiently prepared for the changes.

Customers benefit from more competitive prices and improved service levels and are very eager to adapt to such technology disruptions, leaving the wholesaler and distributor at high risk of failure. Wholesalers and distributors are squeezed in between manufacturers and demanding customers and are left with little bargaining

options to themselves. The result of price pressures from changing value chains, strong manufacturer brands, direct selling, and borderless web provide global price advantages to customers.

This paper focuses on the challenges faced by wholesalers and possible solutions to these challenges.

In order to do so, it is essential to understand the demands of installers and contractors as these are the primary direct customer groups for electrical wholesalers.

Electrical wholesalers can be distinguished as international wholesalers, local wholesalers and mid-sized distributors.

International wholesalers

This refers to the well-developed segment of electrical wholesalers who operate in many countries in the developed world and represent most famous global brands, have multiple branches and stock locations, and are very successful global businesses that are multi-national corporations (MNCs).

Local wholesalers

In Asia and the Middle East, there are large wholesalers, who operate locally and are large businesses within their country of operation. They mimic global wholesalers and are family businesses that have grown their business due to their experience and knowledge of the local market.

Distributors

Small to mid-sized distributors that distribute a range of electrical products and offer customers a choice of options to procure their electrical needs.

For this research paper, the different type of wholesalers is considered as one collective group as the challenges faced by all of them are similar concerning e-commerce.

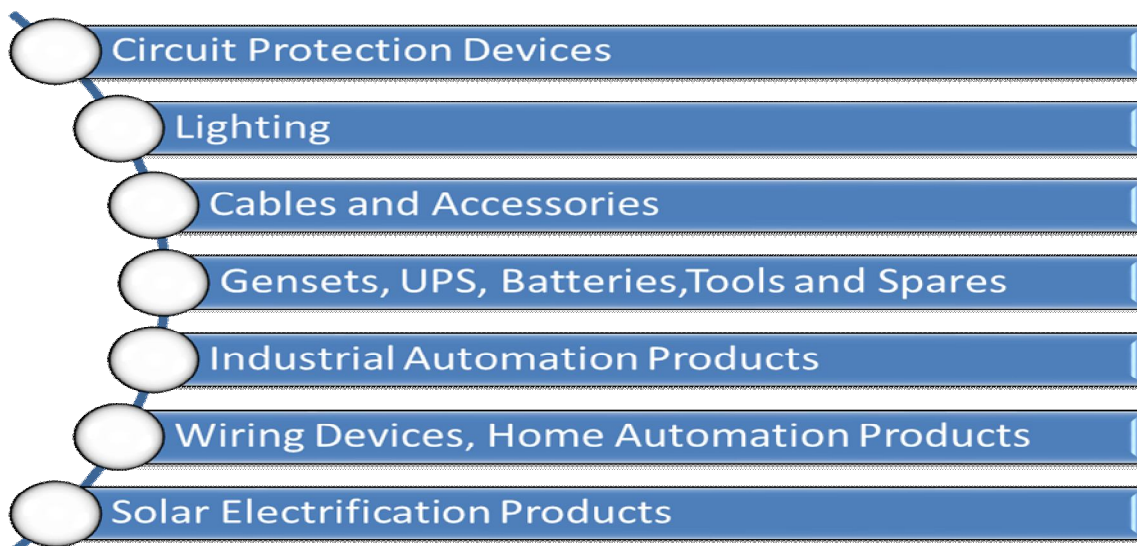
The electrical wholesaler business requires multiple competencies as the products sold are technical in nature and installation and commissioning and service becomes an essential aspect of the business for many products. The wholesalers also sell commodity products like cables, copper bars, etc., which are simpler to manage. They sell product ranges from small lamps and fittings, to complete low voltage switchgear and panels to cater to the varied market segments.

Highly technical products require expertise and technically qualified sales and service teams to serve the customer's exact needs. Most wholesalers have an extensive product portfolio and a large stock of products from various manufacturers.

Wholesalers act as intermediaries between manufacturers and the end customers that are varied in nature, such as OEMs, industries, contractors, panel builders, electricians, and homeowners.

Due to this broad portfolio of products, they have large stocks and stock management is a significant factor in successfully managing a business, as excess inventory will result in stagnant dead stock and a resulting loss in business.

Products sold by electrical Wholesalers



Source: Conceptualized by the researcher.

Electrical products are classified based on three stages, namely generation, transmission and distribution. The generation stage involves high voltage products, transmission involves medium voltage products, and the distribution stage involves low voltage electrical products.

Electrical wholesalers focus on the distribution side of electrical products, in which they stock and sell a complete range of products and cater to various customer segments that procure and install these products in commercial and residential buildings. The products include air circuit breakers, MCCBs, MCBs, distribution boards, junction boxes, wiring accessories, cables, cable trays, generators, ups, solar PV modules, enclosures etc.

Due to the large variety of products they represent and the multiple brands they sell, they have challenges unique to their operation, and the disruptive technology advance of e-commerce has thrown many challenges to their future existence. There are challenges related to sales management, logistics management, resource management, and finance management. To understand this better let us represent their challenges and opportunities through a SWOT analysis as below.

SWOT Analysis of Electrical Wholesalers



Source: Conceptualized by the researcher.

As we can observe the threats faced are a risk of failure due to rapid technological advances in E-commerce, which can be contained only by quick adaptation to the changing trends. This involves a focus on multiple disciplines of their business, which is summarised in the picture.

STRENGTHS

- Acts as a one-stop shop for customers where they can source their complete needs of electrical products.
- Offers flexible credit terms, commercial and technical support to the customer.
- Plays the role of a manufacturer to fill the gap by addressing customer needs and promoting the manufacturer's business to reach all customer segments.

WEAKNESSES

- Squeezed between manufacturer and customer resulting in low margins.
- Lack of control as manufacturers pull strings in significant decisions.
- Complexity of managing multiple brands, which includes sales management, stock management, and resource management.
- Risk of redundancy of stocks, resulting in financial loss.
- Deployment of high working capital in stocks and extended credit terms.

OPPORTUNITIES

- Can quickly adapt to market changes and grow business by being flexible.
- In the ever-changing world where technology has driven the growth and launch of new products, electrical wholesalers should look at the future as an opportunity, embrace innovation, and align their activities and resources based on market needs. Since they do not have significant capital investments and their only concern is working capital invested in stocks, they can quickly adapt and align their business.

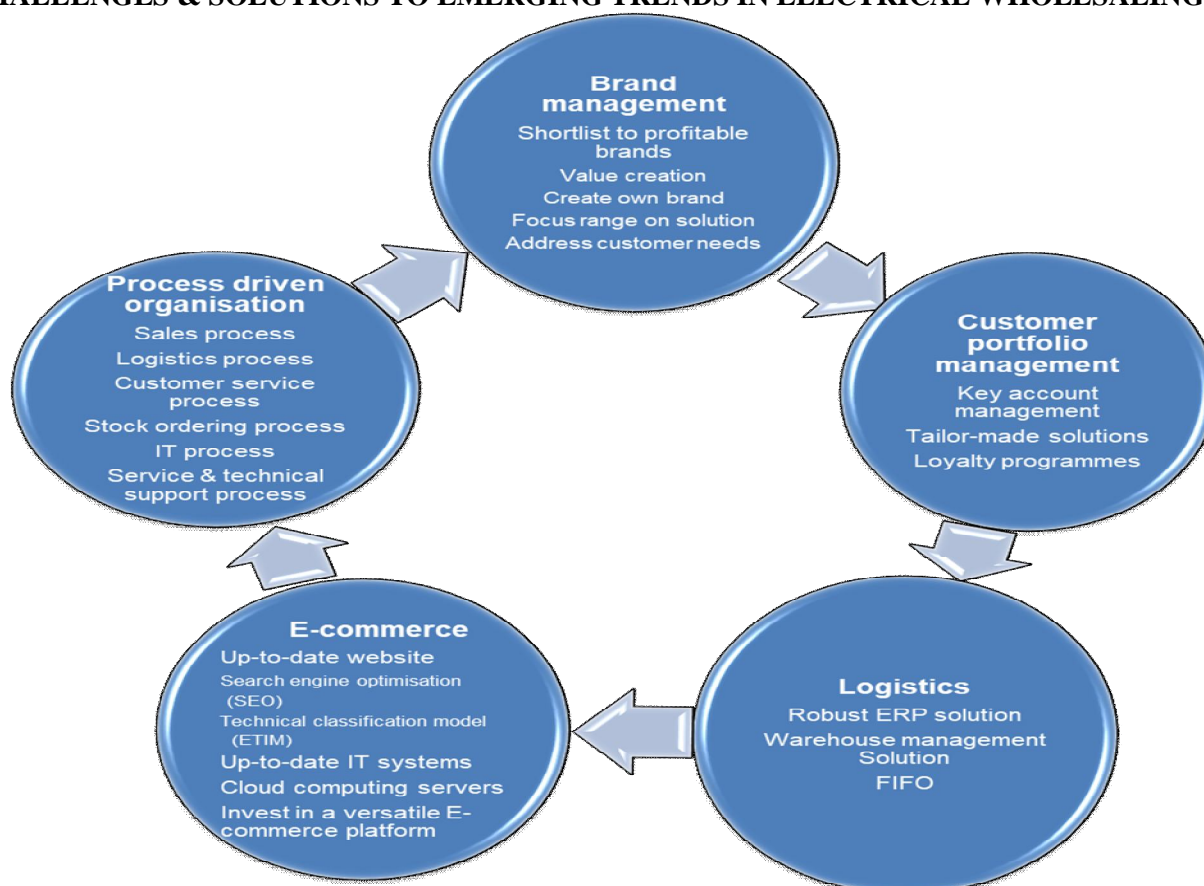
THREATS

- Risk of failure of brick and mortar sale points due to the quick emergence of e-commerce.
- High investment will be required to be a relevant player in e-commerce.
- Lack of experience can result in failure.
- The multi-faceted disruption due to technology leaves less scope for foolproof planning and investment. Well-planned investments can go wrong due to the nature of disruptive technology.

We can observe that the challenges faced by electrical wholesalers are many and that only the future will determine the real role of electrical wholesalers in their present size and shape.

To address the multi-faceted challenge a framework is proposed which can help navigate the disruption better.

CHALLENGES & SOLUTIONS TO EMERGING TRENDS IN ELECTRICAL WHOLESALING



Source: Conceptualized by the researcher.

BRAND MANAGEMENT

Electrical wholesalers are used to representing a large portfolio of products. They try to cater to the complete industry and varied customer segments.

To retain leadership, electrical wholesalers have to analyze their portfolio of products and prioritise the brands that add value to their portfolios. E-commerce will throw extremely competitive options into cyberspace, and hence operating with uncompetitive price points in mass products will result in a negative image for the seller.

Hence, electrical wholesalers should focus on the brands that are exclusively represented by them, brands for which they have a price advantage, and those that are profitable.

Wholesalers will also benefit from developing their own brand and working on establishing their brand name. This way they will retain hundred percent market share for products, which are their own and will avoid the risk of competition.

Further, wholesalers will do well to focus on developing a product range that will cater to a customer segment and can provide a complete solution. This way they can retain customers,

It is advantageous for wholesalers to understand the needs of customers and provide solutions to their issues. Hence, brand housekeeping and management becomes a vital part of the wholesaler's success strategy.

CUSTOMER PORTFOLIO MANAGEMENT

While evolving e-commerce trends threaten the retail industry, customer portfolio management becomes an essential aspect of the business strategy for electrical wholesalers.

Historical data should be analysed, and key customers who contribute to the companies' success should be identified. Key account managers should ensure that they meet important customers regularly and given information about their e-commerce operations, and operate as the bridge between customers and the company.

Though most buying decisions are taken remotely, information exchange and updating customers about products and methods to avail benefits from the company will become important. Companies should incentivise loyal customers with loyalty programmes and encouraged to take advantage of the additional benefits of being loyal to the company.

Electrical wholesalers should try to develop tailor-made solutions specific to customer needs. This way they will gain an advantage in addressing customer needs and retain their business.

LOGISTICS

Logistics and stock management is another critical aspect to succeed in electrical wholesaling. With the developments in e-commerce, an up-to-date ERP system which can support the requirements of e-commerce, marry the various transactions, and run a stable operation is a prerequisite. A warehouse management system which can link to the ERP system and is supported by RFID scanners, barcoded stocks, and bin management becomes vital. First in first out (FIFO) management of stocks should be adopted to ensure the health of stocks.

The logistics of an e-commerce driven company are more demanding, and technology upgrades become a necessity, as goods bought online have to be immediately reserved, picked, packed and dispatched to reach the customer at the shortest possible time. Companies should realise they compete with world giants in e-commerce like Amazon and Ali Baba who promise same day delivery for most of their in-stock products.

Automation in logistics becomes an essential upgrade in order to succeed in the e-commerce business.

PROCESS DRIVEN ORGANISATION

Electrical wholesalers have to shed their traditional operating styles and become process driven organisations that will rely more on data, information, and action.

Every department has to be process driven, including sales, customer service, purchase, logistics, finance and IT. This way the risk of failure due to the wrong judgement is minimised.

Every department's tasks have to be mapped, and process mapping for all activities concerning the organisation should be completed as a project. This process mapping manual can also serve as a training manual for new employees. Hence the discipline and consistency of work output can be maintained.

This is another prerequisite for facing the future and companies that are well organised will be better positioned to adapt themselves to new technologies and changing trends easily.

E-COMMERCE TRENDS

E-commerce trends are reaching a critical point in B2B space. We can see for ourselves our changed buying habits concerning retail purchases. Online selling has revolutionised the retail space, and there are many small businesses seriously affected by this disruption. Malls are seeing lesser footfalls, and in developed countries, many small and mid-sized malls are closing down due to lack of business.

B2B e-commerce is projected to be much higher than B2C. Young millennials who will be the next generation's B2B buyers will opt for B2B online platforms rather than traditional purchase from visiting showrooms and salespeople. They expect to have the seamless experience of online shopping. This means that companies have to invest and develop in technology platforms that can not only support self-serve buying through multiple touch points like laptops, mobile phones, and tablets but also develop apps which will satisfy their unique requirements.

Since there are significant challenges involved in developing an e-commerce platform for large and diverse businesses due to the breadth of product offering, execution of contract pricing, and support for purchase order processing and project deliveries, we can also conclude that there are real growth possibilities for companies that successfully achieve this feat. The room for expansion becomes immense for early adaptors.

Some ideas for being early adaptors and succeeding in e-commerce are listed below.

Companies should aim to have strategies like offering extended warranties, service and technical backup to suit customer needs and be one-stop shops to address all customer requirements. They should offer a competitive price advantage, provide differentiation of their product offering, and develop tailor-made solutions for customers. This way they will retain their customers.

They also have to manage their key accounts and be advisors rather than sales companies in product selection. An advisory role will be well respected by online buyers.

UP-TO-DATE WEBSITE

Companies should invest in creating a website that is up-to-date and modern, which functions as a point the customer will look to for finding his solutions. The website should have technical articles and blogs written by industry experts, along with possibilities for customers to interact and clear their doubts about the products and the technology.

SEARCH ENGINE OPTIMISATION (SEO)

Companies should invest in SEO and ensure they are seen at the top when the customer searches for a product family which the company represents. This is very important to fetch good customer web traffic.

TECHNICAL CLASSIFICATION MODEL (ETIM)

As electrical wholesalers represent multiple brands, there is a challenge to create and update the website with up-to-date technical information. To resolve this and have a uniform representation of products and their technical features, a new platform is gaining momentum.

Manufacturers in Europe are collaborating on a common platform called ETIM where they upload products and their technical details in an accepted format. This wealth of data is stored in a shared server, which the wholesaler operating in any part of the world can access with permission from the manufacturer. This will resolve the problem of uniform representation of products. Every product of a similar category has the same amount of technical information displayed, with space to describe their unique features.

Wholesalers investing in e-commerce websites should ensure that they can seamlessly link to ETIM and allow information exchange, which will help them be up to date on their multi-brand portfolio without investing much time in updating.

UP-TO-DATE IT SYSTEMS AND CLOUD SERVERS

Wholesalers also have to invest in an up-to-date robust and reliable ERP system which can manage their systems, invoicing, stock management and despatches as these are critical parameters for being a successful e-commerce business.

Companies will do well to rent cloud servers instead of investing in physical infrastructure for servers as this can save costs and allow them flexibility.

PAYMENT OPTIONS

Electrical wholesalers succeed mainly due to the credit terms that they offer to various customers. This is different compared to B2C online sales where payment is through credit cards or cash against delivery.

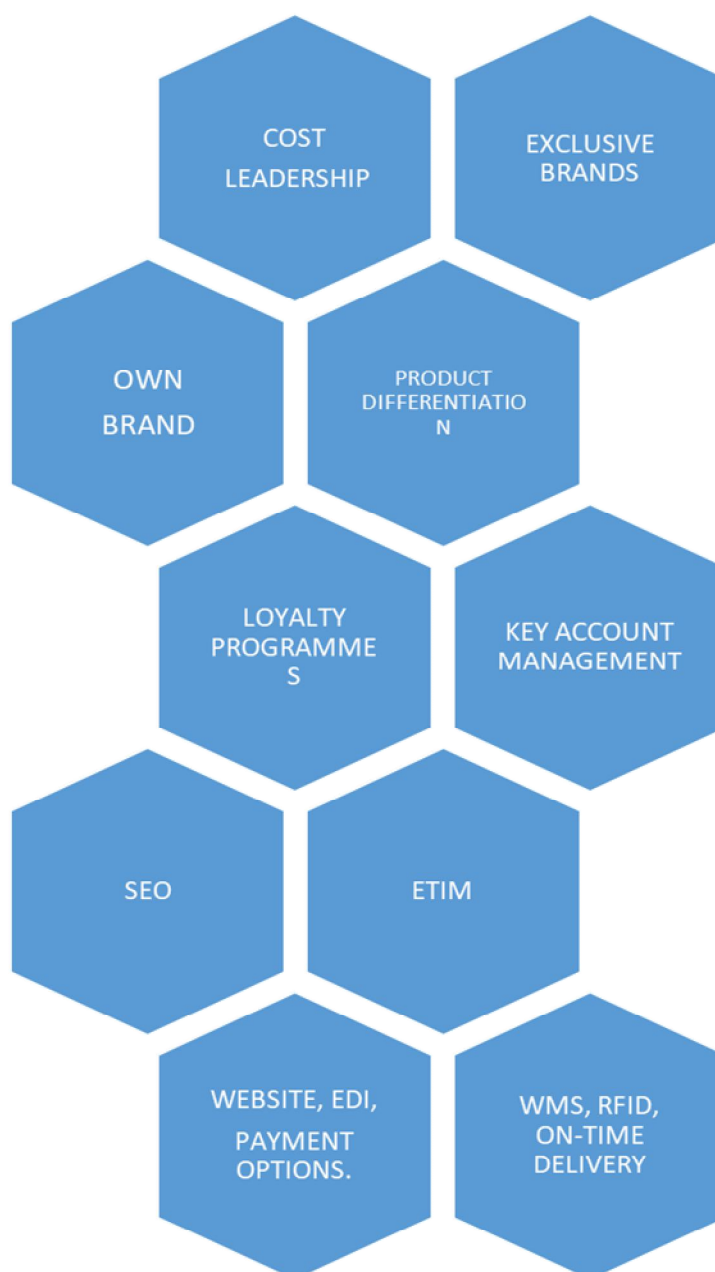
Companies will benefit to modify payment options to suit their customer needs and allow pre-approved customers to order based on their credit limits. This will be a game changer and can help retail customer loyalty based on the credit terms they enjoy with the electrical wholesaler.

The data indicates that countries like Sweden have been early adopters of e-commerce for electrical products and their share of online purchases are growing at a rapid pace. Major electrical manufacturers have come together to collaborate and make this change smoother.

Companies in Asia can learn from the existing experience present in the developed world, and so they have some comfort in adapting to some of the tested practices from Europe where the evolution of B2B e-commerce is more advanced. These Asian companies are going through the learning curve and making the necessary adjustments. I hope that this will help the new economies and developing countries that will embrace e-commerce in the B2B segment in the coming years.

BUILDING BLOCKS FOR E-COMMERCE IN ELECTRICAL WHOLESALING

An attempt to show the building blocks depicting the specific actions to be undertaken by wholesalers to be fully prepared to face the upcoming disruptive market change of e-commerce in electrical wholesaling



Source: Conceptualised by the researcher.

CONCLUSION

The world has evolved from the Stone Age to a highly advanced electronic age. There has been disruption all along, and we have witnessed plenty of technological advances in our lifetime.

Human beings adapt quite quickly to changing environments. Electrical wholesalers have to get prepared for this disruptive market evolution, which is imminent in a short while from now.

The opportunities for early adaptors are immense.

The various strategies, which an electrical wholesaler can take to survive this market disruption, is detailed in the paper.

Electrical wholesalers have to re-look at their product portfolio and focus on products, which add value to their operation, and products where they have the exclusive right to distribution.

They might have to reduce their focus on products, which do not make business sense as with the expansion of e-commerce,

The electrical wholesaler will have to invest time and resource to develop his or her own brand for various electrical products. This helps them have control over pricing and market access.

Electrical wholesaler has to build and manage their logistics as per the latest trends, introduce WMS, and focus on professional order execution systems.

Electrical wholesaler has to invest in software and web site development to have an up-to-date website, which can integrate with platforms and give customers a smooth buying experience.

As we can observe Electrical wholesaler has the freedom to approach this issue, one block at a time “a building Block approach” which will still be useful and make them prepared in good time when B2B e-commerce fully engulfs the market.

This paper has given all the building blocks listed down, addressing even the subtler aspects of adaptation and develop a framework that can help firms who wish to invest in e-commerce.

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WORK VALUES OF WOMEN TEACHERS**Stalin Sahaya Seelan M.¹ and Dr. Amalraj A.²**Research Scholar¹, M. S University, TirunelveliResearch Supervisor², St. Xavier's College of Edn., Palayamkottai

ABSTRACT

The present study was aimed at the work values of women teachers. The crucial status of Women teachers should be taken to the main focus by considering their role as a mother, wife a breadwinner and other roles in the family and then as a teacher. No evidences needed to conclude that they can influence the student very much. Their work values will enhance the future society. Their caring statements in mother tongue, the less number of students for her class, the working environment which influence her work values should be taken into account. Her experience in teaching should be recognised. The environment which we provide for her will have the space where they build our nation.

INTRODUCTION

Teaching profession is the noblest profession. Teaching is not only confined to imparting information to children and preparing them for the examination. The teacher's function in education demands the fullest development of all potentialities in the field. She must be conversant with all sorts of activities both curricular and co-curricular. In a democracy which is secular in character the teacher has to judiciously guide the students through appropriate activities So that students can understand the ethical value of life not only for the good of the society but also for their own happiness. An ideal teacher will serve up duties as best as she can in co-operation with others. She as "friend, philosopher, and guide" allows children to choose their work according to their abilities and interest. She must deal with the problem of children with a spirit of co-operation without any show of authority. Love and sympathy are the watch words for a modern teacher. In general, the way she acts is based on her work values.

NEED AND SIGNIFICANCE OF THE STUDY

Work Values indicate something what one considers worthy of position in thought and action. One view is that values have a particular cognitive structure that produces a structural similarity between general values and Work Values. Teachers who firmly believe in work values are likely to manifest them in the performance. Teacher should have feelings of value and loyalty to their occupations or professions, their employer and their schools. Teachers who believe that work is important and who take pride in their work are expected to respond favorably to job enrichment, that is, to want important jobs where they can display their initiative and commitment. It will be better if we made an attempt to study the influence of Occupational stress on Work Values of Women teachers.

STATEMENT OF THE PROBLEM

Teaching is a noblest profession. It is the teacher who is the embodiment of knowledge, who can help and guide young mass. It is an accepted fact that the teacher is the creator of future citizens of society. The quality of education is largely determined by the quality of teachers who make it. Therefore it is necessary to find the level of work values among women teachers especially. The professional growth of teacher influences the growth of the country. So it is necessary to find the work values in order to understand the situation of women teachers and find the solutions. So, it is worthwhile to find the *Work Values of Women Teachers*.

OPERATIONAL DEFINITIONS OF THE STUDY

According to the investigator; operational definitions of the terms used in the title of the study is given below:

Work Values indicate something what one considers worthy of position in thought and action. One view is that values have a particular cognitive structure that produces a structural similarity between general values and Work Values. Here work values are represented by the total scores obtained on Work Value Scale constructed by the Investigator and Dr.Amalraj.A.

Women Teachers refers to female teachers working at Government, Aided and Self-finance schools of Kanyakumari Revenue District of TamilNadu State.

OBJECTIVES OF THE STUDY

1. To find the level of Work Values and its dimensions of women teachers
2. To find whether there is any significant difference between Rural and Urban School Women Teachers in their Work Values and its dimensions.

3. To find whether there is any significant difference between Tamil and English medium School Women Teachers in their Work Values and its dimensions.
4. To find whether there is any significant difference among Women Teachers of different type of schools with respect to their Work values and its dimensions.
5. To find whether there is any significant association between teaching experience of women Teachers and their work values and its dimensions.

HYPOTHESES OF THE STUDY

1. The level of Work Values and its dimensions of women teachers is moderate
2. There is no significant difference between Rural and Urban School Women Teachers in their Work Values and its dimensions.
3. There is no significant difference between Tamil and English medium School Women Teachers in their Work Values and its dimensions.
4. There is no significant difference among Women Teachers of different type of schools with respect to their Work values and its dimensions.
5. There is no significant association between teaching experience of women Teachers and their work values and its dimensions.

METHODOLOGY IN BRIEF

The method adopted by the investigator for the present study is Survey method to find the Work Values of Women teachers. By keeping the various objectives of the present study, the investigator has necessitated the Work Values scale developed and validated by the investigator and Amalraj.A (2015) for the data collection. This study was conducted on a population of Women teachers working in the schools of Nagercoil, Thuckalay and Kuzhithurai educational districts of Kanyakumari Revenue District. The sample of this study consists of 938 women teachers working in the schools from the three educational districts of Kanyakumari Revenue district. The Investigator has used random sampling technique for selecting the sample from the population. The investigator has used Arithmetic Mean, Standard Deviation, 't'-test, ANOVA and Chi-square for processing the data.

ANALYSIS OF DATA

Hypothesis 1 The level of work values and its dimensions of women teachers is Moderate.

Table-1: Level of work values and its dimensions of women teachers

Work values and its dimensions	Low		Moderate		High	
	N	%	N	%	N	%
Curricular activities	20	21.6	734	78.3	1	0.1
Co-curricular activities	20	22.2	724	77.2	6	0.6
Professional growth	15	16.2	659	70.3	127	13.5
Relationship with students	96	10.2	837	89.2	5	0.5
Relationship with parents	17	19.0	574	61.2	186	19.8
Relationship with community	16	17.6	603	64.3	170	18.1
Relationship with Higher authorities	11	12.0	782	83.4	43	4.6
Work values	13	13.9	683	72.8	125	13.3

Since the percentage of Moderate level of Work Values of women teachers is more than 50%, the hypothesis is accepted. Therefore, the level of Work Values and its dimensions of women teachers is Moderate.

Hypothesis 2 There is no significant difference between Rural and Urban School Women Teachers in their Work Values and its dimensions.

Table-2: Difference between Rural and Urban Women Teachers in their Work Values and its dimensions

Work Values and its dimensions	Location of School	N	Mean	SD	't' value	Remarks at 5% Level
Curricular Activities	Rural	512	48.83	11.139	0.835	NS
	Urban	426	49.40	9.830		
Co - curricular	Rural	512	50.58	11.144	1.164	NS

Activities	Urban	426	49.79	9.652		
Professional Growth	Rural	512	48.94	9.620	1.068	NS
	Urban	426	49.58	8.764		
Relationship with Students	Rural	512	50.05	9.954	0.967	NS
	Urban	426	50.61	7.850		
Relationship with Parents	Rural	512	49.78	11.985	1.031	NS
	Urban	426	49.01	10.666		
Relationship with Community	Rural	512	49.99	10.631	0.298	NS
	Urban	426	49.79	9.997		
Relationship with Higher Authorities	Rural	512	48.22	9.361	4.764	S
	Urban	426	51.20	9.702		
Work Values	Rural	512	49.62	10.714	0.937	NS
	Urban	426	50.22	8.723		

(At 5 % level of significance the table value of 't' is 1.96)

NS Not Significant (Null Hypothesis is accepted)

S Significant (Null Hypothesis is rejected)

It is inferred from the above table that there is no significant difference between rural and urban Women Teachers in their work values and its dimensions such as curricular activities, co-curricular activities, professional growth, relationship with students, relationship with parents and relationship with community. But there is significant difference between rural and urban Women Teachers in their dimension of work values relationship with higher authorities. It can be concluded that the Urban School women teachers are better work values in maintaining Relationship with Higher Authorities.

Hypothesis-3: There is no significant difference between Tamil and English medium School Women Teachers in their Work Values and its dimensions.

Table-3: Difference between Tamil and English medium Women Teachers in their Work Values and its dimensions

Work Values and its dimensions	Medium of Instruction	N	Mean	SD	't' value	Remarks at 5% Level
Curricular Activities	Tamil	493	50.01	10.933	2.832	S
	English	445	48.07	10.052		
Co - curricular Activities	Tamil	493	51.00	10.905	2.414	S
	English	445	49.36	9.962		
Professional Growth	Tamil	493	48.60	9.598	2.224	S
	English	445	49.94	8.788		
Relationship with Students	Tamil	493	50.74	9.544	1.551	NS
	English	445	49.83	8.474		
Relationship with Parents	Tamil	493	49.57	12.042	0.396	NS
	English	445	49.28	10.666		
Relationship with Community	Tamil	493	50.50	10.577	1.864	NS
	English	445	49.24	10.047		
Relationship with Higher Authorities	Tamil	493	48.95	8.675	2.087	S
	English	445	50.27	10.549		
Work Values	Tamil	493	50.14	10.460	0.815	NS
	English	445	49.62	9.152		

(At 5 % level of significance the table value of 't' is 1.96)

NS Not Significant (Null Hypothesis is accepted)

S Significant (Null Hypothesis is rejected)

It is inferred from the above table that there is no significant difference between Tamil medium and English medium Women Teachers in their work values and its dimensions such as relationship with students,

relationship with parents, and relationship with community and work values. But there is significant difference between Tamil and English medium Women Teachers in the dimensions of work values such as curricular activities, co-curricular activities, professional growth and relationship with higher authorities. It can be concluded that Tamil Medium Students have better work values in Curricular and Co-curricular activities. And, English medium women teachers have better work values in Profession growth and Relationship with higher authorities.

Hypothesis-4: There is no significant difference among Women Teachers of different type of schools with respect to their Work values and its dimensions

Table-4: Difference among Women Teachers of different type of schools with respect to their Work values and its dimensions

Work Values and its dimensions	Sources of Variation	SS	Df	M.S.V	Calculated F value	Remarks at 5% Level
Curricular Activities	Between	1606.761	2	803.380	7.297	S
	Within	102939.355	935	110.096		
	Total	104546.115	937			
Co - curricular Activities	Between	1006.782	2	503.391	4.606	S
	Within	102192.128	935	109.296		
	Total	103198.910	937			
Professional Growth	Between	762.047	2	381.024	4.494	S
	Within	79269.111	935	84.780		
	Total	80031.158	937			
Relationship with Students	Between	628.149	2	314.075	3.851	S
	Within	76263.775	935	81.566		
	Total	76891.924	937			
Relationship with Parents	Between	2147.067	2	1073.533	8.383	S
	Within	119736.929	935	128.061		
	Total	121883.996	937			
Relationship with Community	Between	1623.479	2	811.739	7.697	S
	Within	98608.024	935	105.463		
	Total	100231.503	937			
Relationship with Higher Authorities	Between	952.027	2	476.013	5.182	S
	Within	85893.397	935	91.865		
	Total	86845.424	937			
Work Values	Between	1064.482	2	532.241	5.528	S
	Within	90015.847	935	96.274		
	Total	91080.329	937			

(At 5 % level of significance for (2,935) df, the table value of F is 3.03)

NS Not Significant (Null Hypothesis is accepted)

S Significant (Null Hypothesis is rejected)

It is inferred from the above table that there is significant difference among government, aided and self-financed Women Teachers in their work values and its dimensions such as curricular activities, co-curricular activities, professional growth, relationship with students, relationship with parents, relationship with community and relationship with higher authorities.

The Post ANOVA test scores explore that the Women Teachers working in Self-financed Schools are better in their Curricular Activities and Relationship with Higher Authorities. Similarly Government School Women Teachers are better in Co-curricular activities and Professional Growth, Relationship with the students, Relationship with community.

While comparing the mean scores of Women Teachers working in Self financed (49.04), Aided (49.97) and Government (52.28) in their Work Values, the Government Women Teachers are better than Self financed and Aided Women Teachers. In total, Government School Teachers are better in Work Values than Aided and Self-financed School Women Teachers.

Hypothesis 5 There is no significant association between teaching experience of women Teachers and their work values and its dimensions.

Table-5: Association between teaching experience of women Teachers and their work values

Work values and its dimensions	Calculated χ^2 value	Remarks
Curricular activities	20.248	S
Co-curricular activities	8.967	NS
Professional growth	1.772	NS
Relationship with students	13.450	S
Relationship with parents	17.530	S
Relationship with community	15.495	S
Relationship with higher authorities	1.379	NS
Work values	15.525	S

[At 5% level of significance for 4df, the table value of χ^2 is 9.49]

NS Not Significant (Null Hypothesis is accepted)

S Significant (Null Hypothesis is rejected)

It is inferred from the above table that there is no significant association between teaching experience of women teachers and the dimensions of work values such as co-curricular activities, professional growth and relationship with higher authorities.

But there is significant association between teaching experience of women teachers and their work values and its dimensions such as curricular activities, relationship with parents, relationship with students and relationship with community.

CONCLUSION

The Analysis shows that the significance of mother tongue which makes the teachers to have the better interaction with the environment enhances the work values. And Government teachers who have low strength in classes maintain better understanding of the environment which place them in a better position of having high level of work values compared with the Aided and Self-finance schools women teachers which points out the importance of maintaining proper teacher student ratio. On the other side, the study clearly focuses that the importance should be given to the experienced teachers. Their experience enhances their work values. So, teaching experience of the teachers should be considered much while deciding the increment in salary. This study clearly explores the importance of dedication of women teachers for the betterment of the students which leads them as leaders of our society.

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SOCIO ECONOMIC PROFILE OF TRIBAL WOMEN ENTREPRENEURS: A STUDY IN SRIKAKULAM DISTRICT, ANDHRA PRADESH

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The importance of woman entrepreneurship is increasing faster across the world. Women population started recognizing entrepreneurship as the best alternative for empowerment and economic status in the society. The untapped entrepreneurial potentials of woman are gradually been changing with the growing understanding to their role in the society. Entrepreneurship among the tribal communities in the India is gradually gaining popularity with the improvement in education level and also due to the various schemes and programs introduced by the government. Tribes have the unique culture and some products are very unique and by default organic which can be utilized to start the business. Government both at the center and state have introduced many schemes for the welfare of tribes in India. There are schemes which are more specific for encouraging entrepreneurship among tribal women.

Women entrepreneur is a person who accepts challenging role to meet her personal needs and become economically independent. A strong desire to do something positive is an inbuilt quality of entrepreneurial women, who is capable of contributing values in the family and social life. Women's entrepreneurship is not an easy task. Becoming an entrepreneur is an evolution of encountering, assessing and reacting to a series of experiences, situations and events produced by political, economic, social and cultural changes.

India has the world's second largest concentration of tribal population next to Africa. According to 2011 census, the scheduled tribes population in our country is 104.3 million (8.7%), accounting for about one-fourth of the total tribal population of the world, K.S. Sing (1994). According to 2011 census, the schedule tribe population in Andhra Pradesh is 2739919 (5.53). Srikakulam district in Andhra Pradesh was selected as the study area for collection of the data.

In Andhra Pradesh in Srikakulam District, the tribal population constitute 1,66,118 of which females account for 84,736 representing ST sex ratio of 1041.

OBJECTIVES OF STUDY

- I. To understand the socio-economic conditions of the tribal women entrepreneurs in Srikakulam district.
- II. To find out the factors which encourage tribal women to become entrepreneurs

METHODOLOGY

This study focused on socio economic profile of tribal women entrepreneurs. In accordance with the objectives of the study Srikakulam district of Andhra Pradesh was selected because it is one of the districts in Andhra Pradesh where the percentage of tribal population is high and also due to the familiarity of the researcher to the culture and local dialect of the district. The second important reason is because Integrated Tribal Development Agency Programme was initially started in this district. The tribal population in Srikakulam district is 166118 accounting for 6.15% of the total tribal population in Andhra Pradesh. Srikakulam district is ranked fourth among the thirteen districts of AP in terms of tribal population percentage to total population. In Andhra Pradesh State there exist Five ITDA projects namely Srikakulam, Vizianagaram, Visakhapatnam, East Godavari and West Godavari. In each of these ITDA projects Tribal Processing Monitoring Unit (TPMU) were attached and situated at a place which is easily accessible to tribal population in the district. In Srikakulam district the TPMU (tribal process monitoring unit) was located at Seetampeta which was attached to Srikakulam ITDA office. Seven mandals were existing in Seetampet TPU. From these seven mandals four mandals namely Mandasa, Meliaputti, Pathapatnam and Seetampeta were selected based on the number of tribal women entrepreneurs operating in the mandals. A sample size of 60 was considered for the study who are the members of Self help groups and are doing petty business. All the entrepreneurs under the study are first generation/Founder entrepreneurs.

While studying the socio economic characteristics of entrepreneurs, it was considered Important to evaluate the level of formal education because the formal education has always been considered as an important plus-point of an individual in building her entrepreneurial career

TRIBAL WOMEN IN ANDHRA PRADESH

In Andhra Pradesh the percentage of tribal women population is 5.57 according to 2011 census. Earlier tribal women were confined to their traditional way of living. But from the last decade there is a very good

improvement in their literacy rate which was 26.11 during 2001 census. When compared with national women literacy which was 50.43 tribal women rate is fifty percent.

SIGNIFICANCE OF THE STUDY

The present study highlights the socio economic conditions of tribal women entrepreneurs in Srikakulam district, Andhra Pradesh. This study mainly focused on present living conditions of the tribal women entrepreneurs in light of their traditional living system, their educational background, income level, awareness about various government development schemes for the betterment of these tribes etc. Indian government and also the respective state governments are concentrating more on the policies and schemes for the development of tribes and more specifically for the empowerment of tribal women. The study relating to socio economic profile of the tribal women entrepreneurs gives the information relating to important factors which motivates them to become entrepreneurs.

METHODOLOGY

Srikakulam District has been selected for the purpose of present study. The factors that contributed to the selection of Srikakulam District are firstly, this is the foremost District in the State to have the thickest density of tribal population per square kilometer; secondly, this is the District in the State which has gone through a historic and violent revolt of the tribal population as a reaction against various forms of exploitation and injustice caused to them by the traders from the plains. Thirdly, this is the only District in the State where the Integrated Tribal Development Agency Programme was initially started.

The Study is purely based on primary data collected through a schedule from 60 tribal women; who are the members of S.H.Gs and doing petty business.

Table-1: Distribution of respondents according to age

S. No	Category	Frequency	Percentage
1	20 Years	10	16.67
2	21-29	46	76.67
3	30-39	2	3.33
4	39-40	2	3.33
	Total	60	100

Source: Field Study

Age reflects maturity of a person, as there is a positive relation between age and maturity. An attempt has been made to know the age of the respondents at the time of entering the business. As can be seen from the Table-1, an over whelming majority of 76 per cent of the women entered the business between the age group of 21-29 and 16% started business when they were 20 years. Only 3% of the entrepreneurs were between the age group of 30-39 and similarly 3 % were between the age group of 39-40. So it can be understood that entrepreneurial spirit is more between 21-29. age group.

Table-2: Social Category

S. No	Social category	Frequency	Percentage
1	Kapu Savara	20	33.33
2	Konda Savara	14	23.33
3	Jatapu	26	43.34
	Total	60	100

Source: Field Study

In Srikakulam district, only two types of tribes are more in number. They are Savaras and Jatapus. In some tribal pockets of the district, Gadabas are also found but their share is very much less. In the study area, out of the sample 60 women respondents presented in table 33.33% belong to Kapu Savara and 23 % belong to Konda Savara and the remaining 43% belongs to Jatapu. Majority of the Jatapus are well developed compared to their counterparts Savaras.

Table-3: Size of the Household of women entrepreneurs

e	Number of members in the family	Frequency	Percentage
1	4	13	21.66
2	6	40	66.67
3	8	7	11.67
	Total	60	100

Source: Field Study

Family is the primary group wherein every member is directly associated with its activities. The type and size of the family determines the extent to which an entrepreneur can take decisions by himself/Herself. An important issue for the success of entrepreneur is the support from family members. Both nuclear and joint families had certain advantages and disadvantages in facilitating entrepreneurship. In the study 60 percent of the women entrepreneurs have joint family and the remaining belong to nuclear family. Size of the household is one of the indicator for earning more income for the family. The data in table 3 shows about 66 % of the women entrepreneurs family size is six followed by 21 % with 4 members and 11 % with 8 members.

EDUCATION

While studying the socio economic characteristics of entrepreneurs, it was considered important to evaluate the level of formal education level of women entrepreneurs because the formal education has always been considered as an important plus-point of an individual in building his/her entrepreneurial career. Education also forms an important component in the overall development of individuals, enabling them to greater awareness, better comprehension of their social, political and cultural environment and also facilitating in the improvement of their socio-economic conditions this holds true in the case of the scheduled tribes in India. As a matter of fact education is an asset to any person more so to a women because it helps them to think innovatively and also to become economically independent.

Table-4: Educational level of Tribal women entrepreneurs

S. No	Educational background of women entrepreneurs	Frequency	Percentage
1	below 10th std	9	15
2	Matriculation	17	28
3	Intermediate	30	50
4	Graduate	4	7
	Total	60	100

Source: Field Study

The data in table 4 relates to the educational background of tribal women entrepreneurs. When viewed from the educational background of the tribal women entrepreneurs in the study area it is surprising to note that half of them have studied upto Intermediate, followed by matriculation with 28% and below 10th standard with 15%. An interesting point is that are also a few respondents (7%) who are graduates. This indicates that in tribal households women who completed their intermediate and graduation are possibly the first generation to reach that level. From this it can be concluded that the educational background of the tribal women is satisfactory when compared with the educational background of their parents.

Table-5: Educational levels of Women Entrepreneurs Parents

S. No	Educational background of Parents	Frequency	Percentage	Frequency	Percentage
		Father		Mother	
1	Illiterate	37	61.67	55	91.67
2	Below Matriculation	19	31.67	5	8.33
3	Matriculation	4	6.66	Nil	0
	Total	60	100	60	100

Source: Field Study

The data in the table 5 shows educational level of women entrepreneurs parents. Among the 60 respondents fathers illiteracy percentage is highest (62%) and the below matriculation percentage is nearly 32% and only 4 percent of them studied upto matriculation. Relating to mothers education nearly 92% are illiterates only 8% educational level is below matriculation.

The educational awareness programmes and opening of a number of primary, Ashram and Secondary Schools, with hostel facilities and scholarship in the tribal pockets may be the influencing factors for improvement in the education levels of tribal women entrepreneurs.

Table-6: Occupation of respondents husband

S. No	Women Entrepreneurs husband occupation	Frequency	Percentage
1	Entrepreneur	0	0
2	Government Employee	0	0
3	Private sector employee	24	40
4	Agriculture	33	55
5	Others	3	5

Source: Field Study

The table 6 gives the information about the occupation of respondents husband. Agriculture is the main occupation of 55 percent of women entrepreneurs husband followed by private sector employment (40%) and other are only 5%. The main contributing factor for women opting to become entrepreneurs may be due to inconsistency in agriculture income and in the case of private employees it may be due to low wages. None of the respondents husband are involved in any type of business.

Table-7: Women Entrepreneurs Annual Income

S. No	Annual income of women entrepreneurs family	Frequency	Percentage
1	1-2 Lakhs	54	90
2	2-4 Lakhs	6	10

Source: Field Study

Table 7 relates to the women entrepreneurs annual income. Ninety percent of the women entrepreneurs are earning between Rs. 1 and 2 Lakhs annually while 10 per cent are earning between Rs. 2 and Rs 4 lakhs annually. The income so earned by these women is used for household expenditure especially for children's education. In the absence of this income, the family requirements including children's education and family health care will be affected adversely.

Table-8: Women Entrepreneurs :Type of House

S. No	Type of House	Frequency	Percentage
1	Kutha	14	23.33
2	Pucca	32	53.33
3	Semi Pucca	14	23.33
	Total	60	100

Source: Field Study

Standard of living of a person is judged in terms of house in which a household is living with Government assistance on rural housing. Table 8 shows the data relating to the type of house in which the women entrepreneurs are residing. Out of the sixty respondents 54% of the respondents are living in pucca houses while an equal number of 23% of the respondents are living in semi pucca and kutha houses. The data was collected relating to the availability of toilets in their house and it was observed that only 44% of the women respondents have the facility. Viewed from this angle, the standard of living of the women entrepreneurs under study is mediocre.

PERSONAL DETAILS

Regarding personal details, all the Respondents in the study got married, of course during their teenage. Almost all the respondents (95%) have Aadhar card while 87% have saving bank account. There are however 95% of the women entrepreneurs who are having ration card and are availing PDS facility. Thus the number of non-card holders is negligible and no attempt was made by the researcher to find out the reasons for not having Ration Card. The respondents are asked to make a self-assessment of their place in the society and it is found that 40% of the women respondents expressed that they are very much recognized by the society while 47% expressed that they are recognized and respected at a low-level. However there are 13% who expressed that they are not respected in the society. An insight into the reasons for this predicament revealed that those women who are well educated and are earning relatively better are well respected than their counterparts who are otherwise. In terms of improvement in self confidence ninety percent of the women felt that there was improvement and 53% were of the opinion that they developed the ability to express their views in decision making either in family matters or business.

Sources of Capital for business and awareness about tribal welfare schemes

For any of entrepreneur, capital is very essential more so for working capital. Women get this capital from three sources viz., 1) Domestic savings 2) Govt. Finance 3) Private Finance. For a women especially tribal women households the earning in the family is just sufficient for hand to mouth existence, domestic saving do not exist and as such they are bound to borrow from either banks or private money lenders. As Govt. finance is more comparatively cheaper and in the study it was observed that 85% the respondents availed bank loan, 15% from State Tribal Development Corporation. An attempt to find out the awareness of tribal women entrepreneurs regarding the existing schemes for their upliftment revealed that as many as 62% expressed that they are aware of NREGS, TRICOR Schemes followed by 17% who are aware of only NREGS and 13% who are aware of NREGS, TRICOR & RGVY. It is surprising to note that only 4% know about TRICOR only, while 5% know NREGS, TRICOR and Indira Awas Yojana Schemes.

SUGGESTIONS

Educational facilities are to be improved in the tribal areas to eradicate illiteracy. In this context, government schools to be strengthened as tribal children mostly depend on them. School drop outs be discouraged through incentives and by creating interest in education.

The tribal development agencies should take care of development of tribes in the socio-economic spheres.

Girijan Co-operative Corporation could create awareness among tribes on their forest produce, packaging, labelling and they should get the reasonable prices of their forest produces.

Institutional credit is to be liberalized as most of the tribal's belong to landless, marginal and small farmer categories. They need to be protected from the clutches and higher rates of interest of the money lenders. Banks officials interaction with the tribal women entrepreneurs about the schemes may be helpful to create awareness about the sources of capital.

Entrepreneurship is the outcome of interaction of the individual, environment with socio cultural factors. The Government having recognized this should make efforts to inculcate a spirit of enterprise among tribal population.

Entrepreneurship is the one of the best ways of improving the socioeconomic status of tribal entrepreneurs in society.

Entrepreneurial awareness camps and entrepreneurship development programmes should be organized at the village level. The support of institute of Entrepreneurship Development (IEDS) and centres for entrepreneurship development (CEDS) is very important to organize training programmes in tribal areas.

Entrepreneurship Development Programme could be more pro-active, broad based by focusing on the target group of tribal women entrepreneurs right from stimulate to start up stage.

The influence of success stories play a key role in motivating entrepreneurs. Organising work shops by successful women will be the best platform to interact with them. Good mentorship should be given to startups.

CONCLUSION

Active participation of women in the entire development process is essential for the overall socio-economic development of any Country. Therefore raising the status of women in all respects in the society in general and that of socially and economically backward women in particular is not just a normal comparative one but also a strategic one. Tribes can't easily move out of their habitations to urban areas. Monetary autonomy is the need of great importance. The overall empowerment of tribal women can be done if women have access to participate in income generating activities easily and make them independent and fearless.

Therefore, government policies, programs and schemes should take involvement of tribes to develop their socio-cultural, economic and health conditions in present day scenario by following transparency, participation and accountability criteria to promote both the welfare and development of the tribal people.

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**TRANSNATIONALIZATION CONSEQUENCE ON COLLECTIVE FISCAL OUTLINE OF
CONVERSION IN ETHNIC PEOPLE'S LIFE**

Prof. (Dr.) Sanjay Rout

ABSTRACT

India is moving in developing economy. Most part of the country is of rural population. Due to lot of Industrialization, Policy and technological advancement a lot change happen in the rural development on village level. The word development has a very broad meaning. Here in this research we are referring it as improvement of socio-economic wellbeing of rural households. Due to globalizations a lot change happens in the people's life along with infrastructure and facility with behavioral change. This research paper is written by doing a study using primary data of a village to understand the socio-economic situation and change happen due to impact of globalization, Industrialization and technological change. Modern technological and policy movements and developing a plan for inclusive holistic development of all the households. The Study first approach was to build rapport with the community. It was done by organising a common meeting with all the villagers, Panchayati Raj Institution (PRI) members, women members of self-help groups (SHG).

After taking different interview, Survey to analyze the change in their life style due to globalization. The various issues of village development were discussed and the people were clarified with the objectives of this village development planning exercise. Current Study is for the Kunduguda Village of Kalahandi district, Odisha (India).

Keywords: Tribal, Social Development, PRI, Livelihood, Population, Technology, Globalization, Tool

INTRODUCTION

Micro level Plan is an essential document for livelihood promotion and others programme for the vulnerable section. The process of developing the micro plan is as follow; Rapport building with community by organising the common meeting with all the villagers where the various aspects & concept of the village development. The development is focusing the upliftment of the vulnerable section landless poor and very poor house holder and women empowerment with a view for Socio economic development.

- To know the social status of the project the social mapping done during the preparation of development is revised and necessary changes are made by the villagers.
- The villagers did well being analysis of the house hold in terms of their living standard ownership of assets through cards system and target group is identified by the villagers.
- Community Base intervention for improving the quality of life are identified in the common meeting and incorporated in the micro plan.
- Separate meeting with the target group.
- Very poor and poor and SHG are conducted to understand their specific problems and various existing livelihood options. The various option of livelihood promotion has been identified and incorporated in the micro plan.

PRA TOOLS METHODS USED DURING PREPARATION OF THE MICRO PLAN

- Village contact meeting
- Village contact meeting is conducted in which the concept of MLP.
- Social Mapping: This provides the information regarding landless house hold involved in SHG and migration status, which helps in preparation of livelihood Micro Plan.
- Wellbeing Analysis: This provides the information on living status of the households. The households are categorized into four groups very poor, poor, manageable, and well off according to their living status.
- Focus Group discussion: The youth group adolescent girls group and poor group are discussion within. The helps in finding solution, different livelihood options to be promoted for enhancing the livelihood of target individual.
- Discussion with existing SHGs:
- The meeting with the existing SHG provides the information regarding the grade up SHG and various trades are identified to be taken up by the SHG for generation in the group.

FEATURE OF LIVELIHOOD MICRO PLAN

- The livelihood micro plan is an initiative to facilitate community's ownership, cohesiveness into the process of planning implementation & achievements.
- The livelihood micro plan is always flexible process to the target groups because of its discipline process that it is for the people, by the people & of the people.
- The Development partners, stakeholders are in its decentralized process with proper role clarity.
- It is very frequent & transparent & incorporates with social audit process.
- It is the process that the community sensitized to feel free hand to its classified vulnerable & down rank wellbeing families to support in immediate & urgent need basis.
- The deprived sections like women, widow, handicapped, land less and migrants are given more priority for enhancement of livelihood.

MISSION OF LIVELIHOOD MICRO PLAN

To facilitate the rural and non- industrial area development efforts with particular emphasis and focus on the rural poor, youth, women, resources less by improving the skill, knowledge, attitude for Livelihood changes.

To improvement of economical and social wellbeing of people of Kenduguda on a sustainable basis with focus on the rural poor and the disadvantage groups, through participatory plan, research and action.

OBJECTIVES

The prime objective of the MLP to make a Livelihood base planning implementation and maintenance of Livelihood programme on sustainable manner.

THE SPECIFIC OBJECTIVE IS

To finding need base information, Analysis the root cause problem, realization the situation and make an appropriate useful plan. To promote a Participatory replicable, poverty focus and environmental beneficial approach to farm and nonfarm, Agro base livelihood development and adoption by other institutions. To increase a livelihood conditions a rural poor through stable and sustainable farming and non-farming base system approach in similar Socio-agro, ecological condition of planning village.

NEED AND SCOPE

Lack of understanding about participatory process of integrated planning and management of livelihood project on sustained basic-lead to adoption of sectorized normative approaches. These approaches culminate into concentration on technical aspects overlooking the local people their need and problems. This micro plan attempt for a detailed account of tools and procedures those are required for ensuring active participation of people Planning and Livelihood management.

STRATEGY

The micro plan systematic and strategy approach for a comprehensive procedure for planning, implementation and management of integrated sustainable livelihood plan. Total community participation and sharing of villagers, need and development of micro plan should be done in priority basis. Formation a small group, focus group and ensure to integration of stakeholder in participation all activities. Empowering through awareness and confidence building and search need base low cost high potential production technology.

HISTORY OF THE VILLAGE

Use of tools- Historical matrix, historical timeline through the integration with villagers and collect some historical event regarding the origin of the village.

Justification of the Village: The village is very small glory and beautiful surrounding the village environment around the forest area. Presently the settlement belongs to Kandha (ST) 45 and Harijon (SC) 24 families are establishing in the village. Total house holds 69 and population are 224.

The village road connecting Lanjigarh to Biswanthpur. The village situated in South side Chanalima, In North side Chhatrapur and in west side main road and east side Vedanta company one part with the Bundel village. In 1997 Vedanta company was purchased some of land from that villagers for establish Vedanta company.

- To improved socio –economic condition of vulnerable group.
- To holistic development on sustainable manner.
- To integrating development with participatory approach.

- To create enabling environment of scope and opportunity for employment.
- To proper utilization of local resources natural, human and Animal.
- To strategy development organisation towards management the resources. In the context improvement and security input capital, participatory gave contribution sharing.

DEMOGRAPHY

Population

Sl No	Caste	Sub-caste	Religion	Total Household	Total Population
01	Harijon	Sc	Hindu	45	142
02	Kandha	ST	Hindu	24	82
	Total			69	224

Land information

Sl no	Type of land	Area in Acres	Types of Suffers	No of Land holder	No of Landless
01	Irrigated land	No			
02	Non Irrigated land	187 Acres	Rain water		
03	Grazing land	12 Acres	Cattle grazing		
04	Forest land	00 Acres	Plants grow up		
05	Waste land	07 Acres	Stone area		
	Total				

Agriculture in Major Crops

Sl no	Type of crops	Area in Acre	Production	No of cultivator
01	Paddy	124	6 Q	45
02	Maize	17	2 Q	05
03	Ragi	09	3 Q	07
04	Black Gram	07	2 Q	06
05	Kandual	25	3 Q	15
06	Cotton	15	6 Q	10
07	Vegetables	00	00	0

AGRICULTURE STATUS

A single crop is taken in almost agricultural lands. Improved agricultural practices are not adopted the local people. Hence employment generation in agricultural sector is limited. The agricultural labourers remain idle for the most part of the year harvesting of Khariff crop. The lands which are capable of producing two more crops, after harvesting in Khariff due to lack of irrigation facility.

CROPPING PATTERN

As there is no irrigation facility the agriculture in the Lanjigarh, Chhatrapur and Champadeipur area is totally rained. In majority of agricultural lands, a single crop is grown, Paddy is taken as the main crops, only in the low lands Ragi and pulses are grown as second and third crops to negotiable extent using the residual. Soil moisture minor millets are often grown in the infertility uplands. Crop rotation is not observed as in cultivate area.

LIVESTOCK

Caste	Cow	Buffalo	Goat/Sheep	OX	Hen/duck
Kandha	07	30	123	52	198
Harijon	08	26	96	33	81
Total	15	56	219	85	279

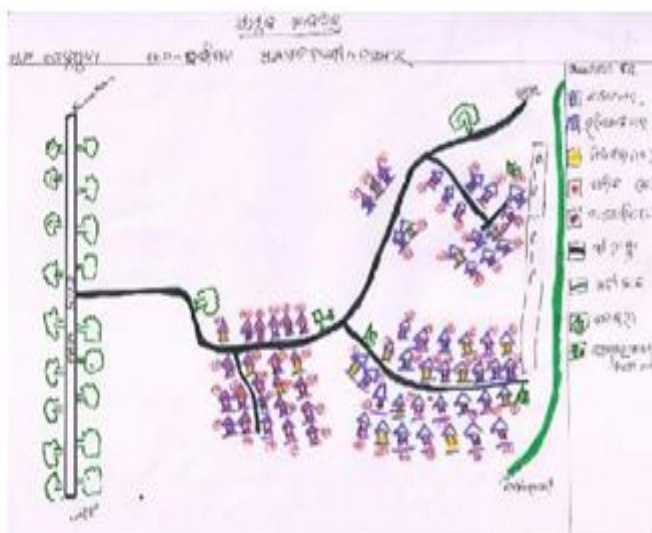
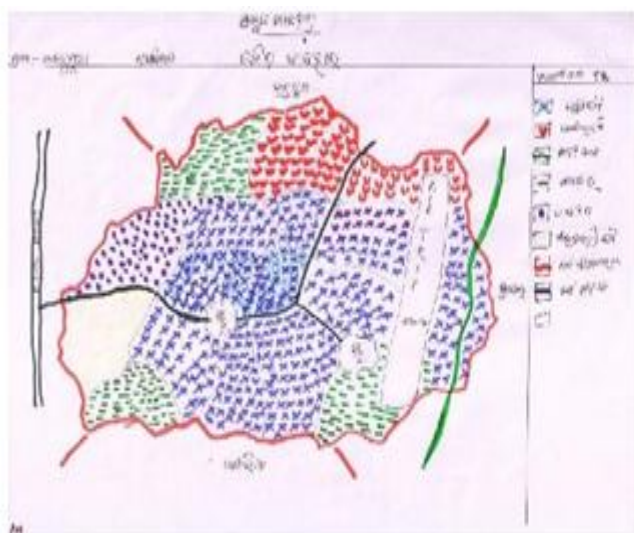
Livestock Management problem: Like stock management is not taken on commercial basis. The domestic animals are available in the livelihood, but less production and adequate care is not taken by the people for animal husbandry health care. Hence there is no initiative scope searching by the villagers for employment in this sector. Due to lack of awareness and unknown.

VILLAGE RESOURCES CHANGE MAPS**Livelihood Sources**

Sl no	Type of jobs	Total no of persons	How many days	Percentage
01	Own agriculture farming activities	45		
02	Agricultural Labour	72		
03	Non-Agricultural Labour(Rural) wages	43		
04	Factory Labour (Private)- wages	27		
05	Salaried employment	05		
06	Petty business/ Trade	02		
07	Cattle/ Goat rearing	02		
08	Collect forest product& sale	00		
09	Traditional	00		
10	Govt work- MGNREGS/ MFT	26		
11	Migration in other state	03		

UNEMPLOYMENT

This is the most important problem, but due to the management of nature resources and lack of awareness among the people. Need information to youth mass through establish youth resource center of this area.

**CULTURE/ FESTIVAL/ OBSERVATIONS**

Jhami, Dharani puja, Simba & Kandual yatra, Chaitra yatra and Nuakhai, Dusshera, Kartikpurnima and Pousapurnima etc.

Social Status

Caste	Well off	Manageable	Poor	Very poor	Total
Kandha(ST)	06	12	16	11	45
Harijon(SC)	04	06	06	08	24
Total	10	16	22	19	69

The situation of the Kenduguda village peoples most of poor people. 41 families are poor out of 69. The house holder 59.5% family are poor family in the village.

Facilities

Education: They have a Anganwadi center and Primary School and High School situated at Chhatrapur.

Educational Status

Caste	I to VIII		9th - 10th		+2 to +3		Vocational	Total
	Boys	Girls	Boys	Girls	Boys	Girls		
Kandha	21	16	26	12	04	07	00	86
Harijon	17	12	12	07	09	05	00	62
Total	38	28	38	19	13	12	00	148

Health and Sanitation

Sl no	Types of	Place	No. of	Distance
01	Anganwadi	Kenduguda	1	0 km
02	ANM Centre	Lanjigarh	1	4km
03	ASHA	Kenduguda	1	0 km
04	PHC/ CHC	Lanjigarh	1	4 km
05	Toilets	Kenduguda		0km
06	Veterinary	Lanjigarh	1	4km

Water -Drinking / Bathing/ Agriculture

Sl no	Type of source	No. of	Used for
01	Bore well	05	Drinking , bathing
02	Open Well	00	
03	Tank/ Pond	01 (Solar) donated by Govt	Bathing
04	Stream/ River	01	Bathing, washing
05	PublicTap/ Overhead tank	00	
06	Canal	01 (under repair need)	Agriculture
07	Lift irrigation	00	

Electricity

Slno	Category	Total no of house electrified	Provider company
01	APL	00	WESCO
02	BPL	44	
03	Commercial	00	

Transport

Sl no	Transport	Types of available	No. of availability	Distance from village
01	Public Transport	Private/ Govt bus, Mini buses/ Jeep/ Auto etc	Bus, Jeep	2km
02	Common Transport:	Bicycle, Motor cycle	Bicycle -35	

Road: The Village road is kacha to connect main road 1 km distance from village. The villagers need CC road or Pichu for better communication to other places in a short time.

Recreation/ common facilities

Sl no	Particulars	Availability
01	Playground	No
02	Samaj Mandir	Dharani temple
03	Community Hall	01
04	Library hall	No
05	Others	No

Social Programs

Caste wise	BPL	JC	AAY	APY	Widow	Old Age	Physically challenged	PMAY	BPG
Kandha	09		04	01	11	16	00	06	00
Harijon	11		01	01	16	24	00	05	00
Total	20		05	02	27	40	00	11	00

Market

Sl no	Type of Market	Place	Export items	Import items	Distance
01	Daily market	Chhatrapur/Lanjigarh			1.5/4km
02	Weekly Market	Chhatrapur/Lanjigarh			1.5/4km
03	Mandi	Lanjigarh			4km
04	Others				

Things to be expert and import

Export	Import
Agriculture Product: Paddy, Block gram, Kandul, Cotton, Ragi, Maize, Vegetables etc. Animal husbandry: Cow, Buffalo, Goat, Ox, Hen, Milk	Sugar, Tea, Rice, Oil (Cooking) Oil for health, Salt, Dal, egg, fish, Mutton, gold, mobile, cycle, TV, Watch, Stationary items for ladies, Biscuits, Mixtures, Sleeper, clothes items.
Forest product: Kendu leaf, Sal leaf, Siali leaf, Mahua flower, Fire wood, Sal seeds, Jhuna, Tamarind, Honey, Lakha etc	

Analysis: The farmer's sale their product in low prices in local market and also middle men (Agent). They are not getting actual govt value addition price of their product. The villagers depend daily needs based expenditure in high and income is low, causes of poverty low production, low income, due to short employment, festival celebration expenditure, marriage ceremony, exploitation of market etc.

Problem

- 50% Family income is not sufficient, shortage of employment, no food security, debit (borrower) is a great issue.
- No good drinking water in the village.
- No CC Road connecting in the village. Main road to 2 km Kacha road far from this village. In rainy season very problem to go outside.
- Earning sources is agriculture, forest product and daily wages in private sector.
- Due to small land holder and all the land are depending on rain water, irrigated land not used properly.
- Vedanta company dust spread in the village area. So the air, water and land pollution increase day by day. The people are suffering a lot in physically, socially, economically most of difficulties face of the villagers.

Solution

- To create employment and generate mandatory engagement.
- Skill development to youth, women in land base non-land base sector.
- Renovations lift irrigation facility for agricultural sector. Promote vegetables and others grain cultivation and able to marketing proper cost of price.
- To provide training to youth on Vocational in Tailoring, Agriculture process.
- Production: Goat/ sheep rearing poultry, ducker, Pig rearing and Dairy farming.
- Protection of Vedanta Dust which is flow and affected area of the village.

SEASONAL CALENDAR

Events	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Agriculture												
Daily Wages												
Food Insecurity												
Employment(Private)												
Health Problem												
Water Scarcity												
Social Ceremony												
Livestock Diseases												

Problem Analysis and Solution through PRA

Issues	Causes	Effect	Solution
Drinking Water	Bore well water not sufficient for the people due to dry up in summer.	Shortage of water in drinking and cooking that means unhygienic condition and different types of diseases promoting to the people.	Installed new Depth Bore well and overhead tank to supply drinking to the villagers for good health of the villagers.

Communication	No pacca road from village entrance to main road which is 2 km. In rainy season very difficult to go outside.	In rainy season not easily go the other places, that is time taking.	Avail Govt Provision for CC Road to the village. Apply to Sarapanch and BDO for action.
Food/ Livelihood	Failure of crops harvesting in low production. Lack of employment, Daily wages.	Mal-nutrition Migration Most of Unemployment of village youth. Food insecurity.	Protection of Vedanta Dust. The villagers depend on agriculture, private & public sector work. All villagers interest to work Govt. Scheme/MGNREGS/ AJY and others
Rural Employment	Failure of crops. Single cropping system Unskilled labour	Migration No food Security	Skill development introduction of double cropping through proper technology avail of credit. Provide Skill development training to village youth for better livelihood.

Plan of Action for Village Development Work at Kenduguda

Activity	Place	Period	Process	Role & responsibility
Installed Depth bore well, pipeline and overhead tank connection for drinking water	Middle of the village	2018-19	Pallisabha/ Gramsabha	Panchayat and Block/RWSS
Communication for CC Road	Construct new CC Road/ Pitchu from village entrance to connecting main road which is 2km.	2018-19	Pallisabha/ Gramsabha	Panchayat/ Block/RD
Skill development Training to the village youth in different types of skill for better employment	Kenduguda	2018-19	OLM /Block/ NGOs	OLM/Block

CONCLUSION

After the study it is found that there is a lot change of life status of the village people, and most of people are availing the general essential services due change of globalization and industrialization and lot of policy interventions. The change is affected in rural people's life style and socio economic behavior. It's in a mid-stage of acceptance for reflection. This change will rational and be more frequent in future ensure longer-term association of community development due to globalization.

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LOAD FLOW ANALYSIS FOR DISTRIBUTED GENERATION USING BACKWARD FORWARD SWEEP METHOD

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ABSTRACT

Load flow studies are very important aspects for planning the future expansion of energy systems, as well as for determining the superlative functioning of existing systems. But due to increased energy demand, other problems associated with load flow also arise, such as voltage instability and overload. Therefore, there must be an optimal way to solve these problems and to satisfy the continuity power flow requirements in relation to the improvement of the voltage profile and the reduction of power losses. This document describes the optimal use of distributed generation to solve load flow problems that improves the magnitude profile of voltage and reduces total losses in the line. This proposed approach will be tested on an IEEE 14 test bus system using MATLAB Toolbox, ie PSAT with or without the use of a photovoltaic generator, using the backward sweep algorithm and comparing the simulated results obtained.

Keywords: Load Flow Analysis, Distributed Generation, CPF, PSAT.

INTRODUCTION

Currently, more than thousands of generating stations and load centers are interconnected through transmission lines to make the power system a large network. Therefore, due to this reason, it is necessary to study or analyze the flow of load. A load flow study is an analysis whose objective is to determine the amplitude and phase angles of current and voltage, the reactive and effective power flux in the transmission line under normal conditions in an active supply system. The objective of this load flow study is to provide information on the amplitude of the complete voltages and the information of the phase angle for each bus for a particular load and also the criteria of the voltages and the power of the generator in a system. electric. Once these data are collected, it is possible to easily determine the reactive power of the generator and the power that flows in each branch [4].

The main instrument (in practice) is the voltage profile given by the load flow. This tool will help to avoid the main problems related to the loss or failure of the power supply, also a problem related to the transmission of real and reactive power. Due to the increased energy demand, other problems associated with load flow arise, such as voltage instability and overload. Therefore, there must be an optimal way to solve these problems and to satisfy the continuity power flow requirements in relation to the improvement of the voltage profile and the reduction of power losses.

Many effective methods of charging flow have been introduced and practiced extensively in the power system to solve load flow problems. The well-known methods used are the Newton-Raphson method, the rapid decoupling method and the Gauss-Seidel method, among others. Among all these methods, the Newton-Raphson method is the most used method for the study of load flow. [5] Basically, the use of the Newton-Raphson method in charge flow problems is performed because it is the most appropriate method for finding the critical bus voltage. For optimal performance of the power system, the improvement of the magnitude voltage profile and the reduction of power losses are very important. Of all these methods, distributed generation is chosen from the point of view of optimal load flow analysis [6].

Distributed generation (or DG) can be defined in many ways, but in general it is presented as moderate power generators (typically 1 kW - 50 MW) that produce electricity near a place close to customers or we can say that they are insured as a electric distribution system. The distributed generators are composed of: synchronous generators, induction generators, reciprocating motors, microturbines, etc. The distributed generator can be introduced into an electric power system to improve the magnitude profile of voltage and also reduce total transmission losses in the power system [7].

In this paper, we propose an optimal approach based on distributed generation to improve the voltage profile and reduce energy losses in the system with the help of MATLAB software, ie Power System Analysis Toolbox (PSAT), which is a source Opening Tools MATLAB used in this document for simulating and analyzing an IEEE 14 test bus system to solve load flow problems. Today, PSAT is one of the most preferred programs among many other programs, such as MatEMTP, Matpower, PAT, PST, SPS, VST, etc. Direct response to load flow problems related to the critical voltage profile in the software.

POWER SYSTEM ANALYSIS TOOLBOX (PSAT)

The Power System Analysis Toolbox (PSAT) project was started by Federico Milano for the first time in September 2001. The first public version of this software was put on sale in November 2002 and, subsequently, each user was able to access it. freely for his use. PSAT is a MATLAB based software used in the simulation and analysis of electricity systems. The command line version of PSAT is based on GNU Octave. The main objective of the development of PSAT is that there is a software requirement for the education of the energy system that should be easy to use, easy to use and reliable and also allows users to draw single-line diagrams, show results and plot the time domain Graphs and simulations [3]. PSAT brings as an improved version of the learning process for students. First of all, it appears as an easy-to-use tool for students of the electrical system, as it is based on MATAB. In addition, the user or student implements the MATLAB algorithms and programs on PSAT and modifies it by adding additional features [2].

PSAT offers energy flow, continuum energy flow, optimal energy flow and small signal stability analysis and time domain simulation tools. In its simulation, it basically uses the Newton Raphson solver which has a trapezoidal rule as a method of integration into the most critical bus voltage profile. Today, PSAT is the most acceptable software and used among several programs, such as MatEMTP, Matpower, PAT, PST, SPS. and VST, etc. because it offers several functions instead of the usual software power flow (PF), continuity power flow and / or voltage safety test (CPF-VS), ideal power flow (OPF), consistent signal quality consistent signal (SSSA), time field recreation (TDS), graphical user interface (GUI) and creation of graphical systems (CAD) [3].

This document presents the PSAT used to simulate load flow problems in an IEEE 14 test bus system that uses the PV generator or without using the PV generator for graphic simulation on the critical bus. The results obtained from both simulations are compared and the best results are chosen from each other.

DISTRIBUTED GENERATION

Distributed generation (DG) as any type of electric generator or static inverter that generates alternating current and has the following characteristics, for example: It has the competence to operate in parallel with the utility distribution system. It also supplies a load that can be powered by the electricity system of the public network. Sometimes it is called "generator" [9].

The distributed generator can be introduced into an electric power system to improve the magnitude profile of voltage and also reduce total transmission losses in the power system. When distributed generators are connected to the power system network, it affects the different system profiles, such as voltage regulation, sustained interruptions, harmonics, falls, floods, etc. Along with the different features, DG comprises of an often function in which it make use of the surplus heat from the generation method as an further form of energy for space heating, process heating, dehumidification and also for cooling over absorption refrigeration.

In this paper, Distributed Generation plays an important role in improving the voltage magnitude profile and reducing the power losses in the system with the help of PV Generator. A PV Generator is a part of Distributed Generation which is connected over the most critical bus on an IEEE 14 Bus test system for improving the voltage magnitude profile and the results are simulated with the help of open source toolbox provided by the MATLAB i.e. PSAT. The simulation of the 14 bus system over critical bus is done with or without using the PV Generator and the obtained results are compared thereafter [3].

Table-1: System Parameters

Frequency Base (Hz)	50
Power Base (MVA)	100
Starting Time (s)	0
Ending Time (s)	20
PF Tolerance	1e-05
Max. PF Iteration	20
Dynamic Tolerance	1e-05
Max. Dynamic Iteration	20

The single line diagram of an IEEE 14 Bus test system in PSAT is shown below:

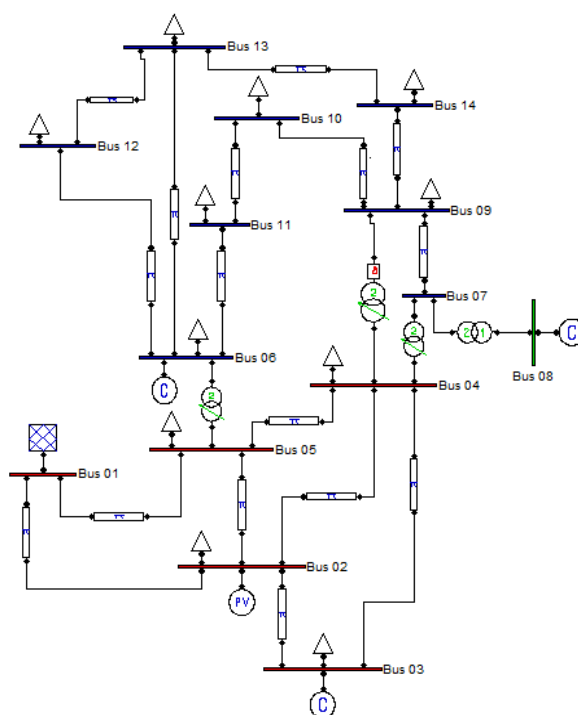


Fig-1: IEEE 14 Bus test system in PSAT

SIMULATION AND RESULTS

This paper describes the modelling of an IEEE 14 bus test system by using PSAT. The problems with the load flow analysis are improved here by using the approach of optimal Distributed Generation. The most critical bus is identified and results obtained with or without using PV Generator are compared for improving voltage magnitude profile and reducing the total power losses in the line.

Results without using PV Generator are shown below:

After the simulation of 14 bus test system in PSAT software, the simulated result is shown above in the figure which shows that the voltage magnitude profile at the bus number 8 is very critical because according to the software predetermined limits if any bus crosses the limit i.e. 1.06 then it is taken as a critical or weak bus

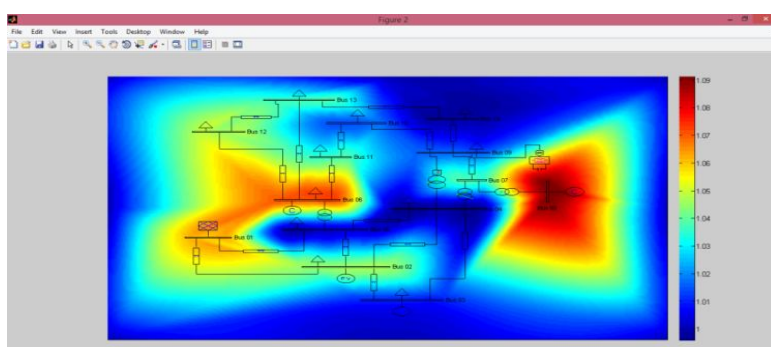


Fig-2: Simulation result of 14 bus system in PSAT for weak bus determination

Power flow using Newton-Raphson Method at each bus before connecting PV Generator at critical bus:

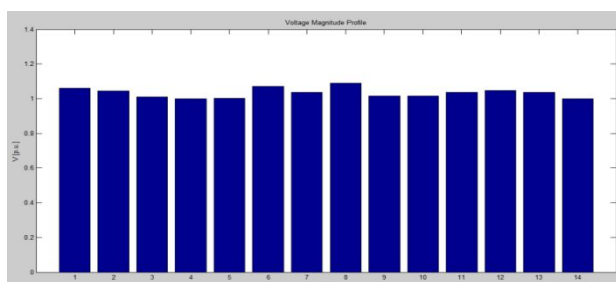


Fig-3: Simulation results of Voltage Profile at each bus without using PV Generator in PSAT

Fig-3 shows per unit voltages at different buses without connecting the PV Generator using Power flow with NR Method.

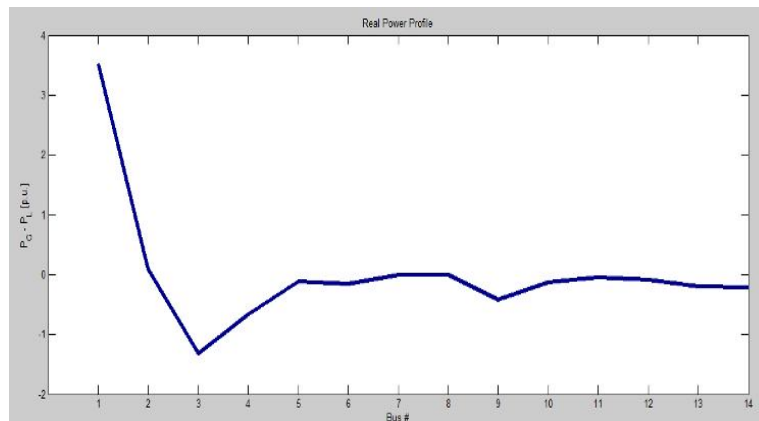


Fig-4: Simulation results of Real Power at each bus without using PV Generator in PSAT

Fig.4 shows per unit Real Power at different buses without connecting the PV Generator using Power flow with NR Method.

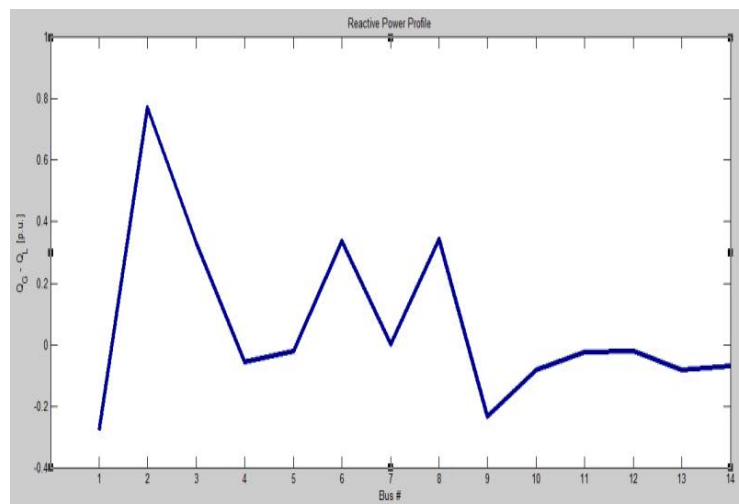


Fig-5: Simulation results of Reactive Power at each bus without using PV Generator in PSAT

Fig.5 shows per unit Real Power at different buses without connecting the PV Generator using Power flow with NR Method.

Results by using PV Generator are shown below:

Power flow using the NR Method at each bus after connecting PV Generator:

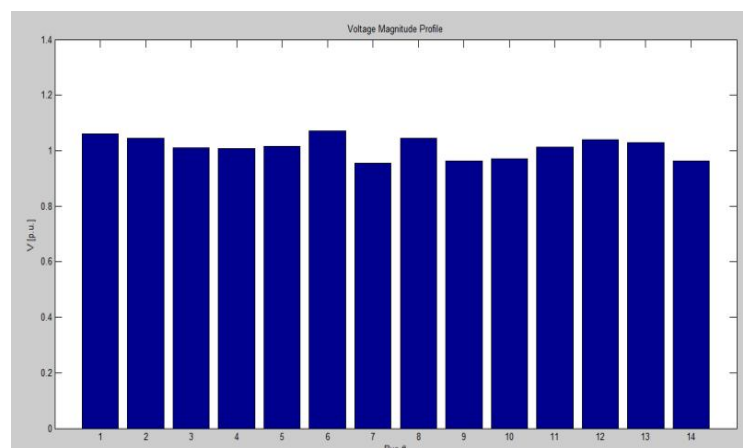


Fig-6: Simulation results of Voltage Profile at each bus using PV Generator in PSAT

Fig.6 shows per unit voltages at different buses after connecting the PV Generator using power flow with NR Method

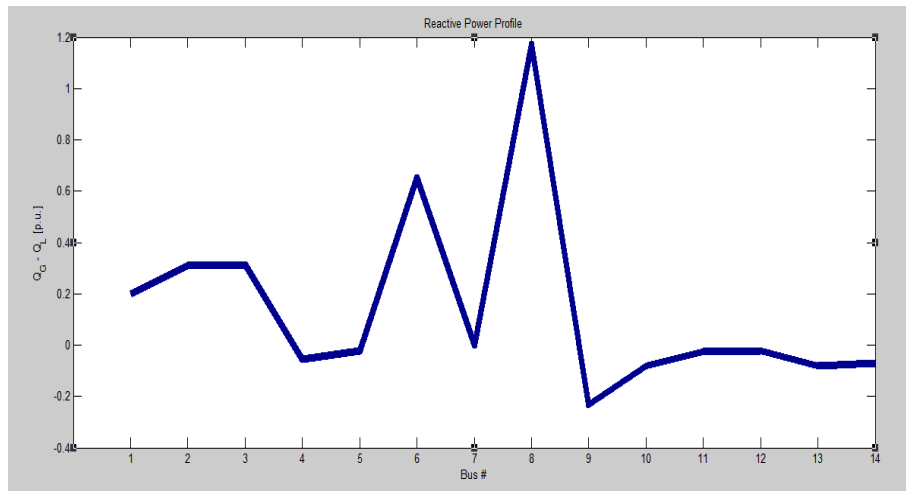


Fig-7: Simulation results of Real Power at each bus using PV Generator in PSAT

Fig.7 shows per unit Real Power at different buses after connecting the PV Generator using Power flow with NR Method.

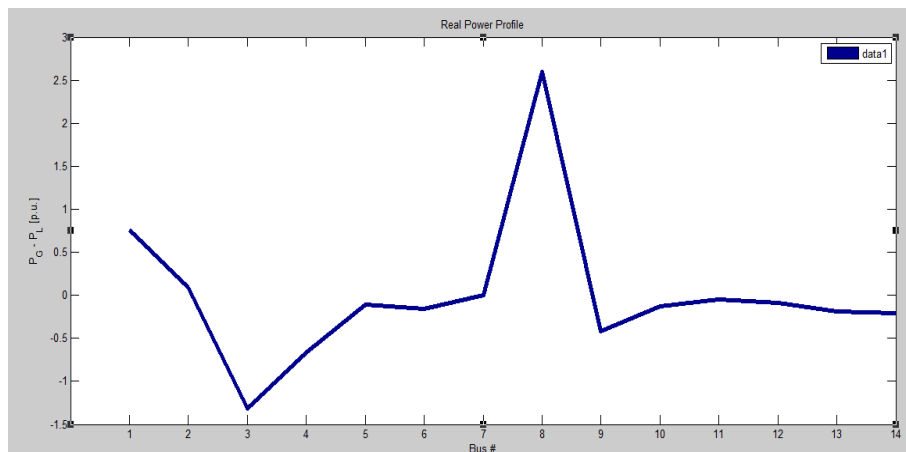


Fig-8: Simulation results of Reactive Power at each bus using PV Generator in PSAT

Fig.8 shows per unit Real Power at different buses after connecting the PV Generator using Power flow with NR Method

Table 2: Power Flow using NR Method having trapezoidal rule as Integration Method without PV Generator

Table 2 shows the values of voltage magnitude, phase angles, total generated Real Power and Reactive Power and total load connected to the system.

Bus	V [p.u.]	Phase [rad]	P gen [p.u.]	Q gen [p.u.]	P load [p.u.]	Q load [p.u.]
Bus 01	1.06	0	0.758019	0.199072	0	0
Bus 02	1.045	-0.03015	0.4	0.486771	0.3038	0.1778
Bus 03	1.01	-0.15191	8.88E-16	0.578051	1.3188	0.266
Bus 04	1.006801	-0.01575	1.2E-14	-4.6E-15	0.6692	0.056
Bus 05	1.015468	-0.02578	4.58E-15	5.82E-15	0.1064	0.0224
Bus 06	1.07	-0.07871	1.69E-15	0.756675	0.1568	0.105
Bus 07	0.954282	0.248121	-1.9E-14	3.02E-14	0	0
Bus 08	1.045	0.725289	2.6	1.17054	0	0
Bus 09	0.96286	0.082775	1.57E-14	7.66E-15	0.413	0.2324
Bus 10	0.970038	0.045054	4.19E-15	8.88E-16	0.126	0.0812
Bus 11	1.013469	-0.02074	1.82E-15	1.01E-15	0.049	0.0252
Bus 12	1.040205	-0.08997	-6.2E-16	-1.1E-15	0.0854	0.0224
Bus 13	1.029044	-0.07856	5.55E-16	-2.2E-15	0.189	0.0812
Bus 14	0.961867	-0.0178	3.41E-15	-2.4E-15	0.2086	0.07

Table 3: Power Flow using NR method having trapezoidal rule as Integration Method with PV Generator Comparison of the simulated results obtained for an IEEE 14 bus test system in PSAT with or without Solar PV Generator:

Table 3 shows the values of voltage magnitude, phase angles, total generated Real Power and Reactive Power and total load connected to the system.

The results obtained from both the conditions conveyed that by using PV Generator in the system improves the voltage magnitude profile on the critical bus and also reduces the total losses. The compared results for the same are shown below in the table 4.

	Real Power (p.u.) without PV generator	Reactive Power (p.u.) without PV generator	Real Power (p.u.) with PV generator	Reactive Power (p.u.) with PV generator
Total Generation	3.9205	2.0553	3.7580	3.1911
Total Load	3.626	1.1396	3.626	1.1396
Total Losses	0.2945	0.9157	0.1320	2.0515

CONCLUSION

This work illustrates the optimal approach based on distributed generation for the analysis of load flow problems using Newton-Raphson Solver with the help of MATLAB-based software, ie Power System Analysis Toolbox (PSAT), which is an open tools source used for simulation and analysis An IEEE 14 bus test system. A photovoltaic generator is part of the distributed generation that is connected via the most critical bus in a 14 bus test system to improve the voltage magnitude profile and reduce total losses in the system. The simulation of the 14 bus system over critical bus is done with or without using the PV Generator and the obtained results are compared thereafter.

A second mechanism is also applied in this dissertation i.e. Backward-Forward Sweep Algorithm Method in MATLAB and a comparison is plotted between the results obtained from the both the approaches. Finally, after the comparison of results from both the approaches, we concluded that the simulation of 14 bus system by using the approach of Backward-Forward Sweep Algorithm Method in MATLAB gives far better results in comparison to the approach based on the Distributed Generation in PSAT software for the improvement of Voltage magnitude profile and reduction of total power losses in the system.

The following conclusions are made after the comparison:

1. Firstly, the voltage magnitude profile is improved by using PV Generator at most critical bus i.e. Bus number 8.
2. Secondly, the active power losses are improved up to 44.8% by using PV Generator.
3. Now, after the PV Generator, we use Backward-Forward Sweep Algorithm method which gives almost 1 p.u. voltage magnitude profile in comparison to the PV Generator which is a very acceptable voltage magnitude profile.
4. The active power losses are also improved up to 21.9% in comparison to the PV generator by using the approach based on Backward-Forward Sweep Algorithm method.
5. Improved System Stability.

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VITUPERATION IN KIRAN DESAI'S NOVEL, THE INHERITANCE OF LOSS

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ABSTRACT

The present paper means to deliver the view of the world in the postcolonial period in Kiran Desai's Award-winning novel, The Inheritance of Loss.

The happiness of progression and festivity of globalization have been skilfully exposed by Kiran Desai in her work. She showed that however the progression of innovation affirmed to make riches and prosperity in incorporating the social assorted varieties, the truth of the matter is that there are a darker side where multitudinous individuals are denied of their fundamental human rights. Desai's thought process recorded as a hard copy The Inheritance of misfortune was to look past the general idea of globalization. With her positive thinking Desai finds the other confused side of worldwide economy, which are less examined. Out of sight of pilgrim mental issues and multiculturalism, Kiran Desai investigates the effect of globalization communicated as far as money related security in outsider terrains, racial separation, sharpness of migration, multifaceted nature of the high society and embitterment acquired out of the extravagance of the West in the post-pioneer period.

Keywords: marginality, alienation, displacement, cultural clashes, globalization, hybridity, insurgency, identity crisis, multiculturalism, racial discrimination, and search for home

INTRODUCTION

In '*The Inheritance of Loss*' Kiran Desai presents the rage for western qualities, habits, dialect, and spectacular way of life. The effect of modernisation, commercialization, and globalization is showed in all strolls of Indian life. Notwithstanding political opportunity, social subjugation is straightforwardly showed through a portion of her characters. Therefore, they can neither absorb the new culture nor would they be able to surrender their unique culture in totality. It isn't simply a matter of adjusting to another condition, or changing in accordance with new traditions, or learning another dialect. It is significantly more significant, and a relocation broad. It is a horrifying procedure of distance and uprooting which may make an irregularity that can influence an individual's emotions, musings and thoughts.

Desai's fiction is intriguing as she depicts and introduces different topics in the wide viewpoint of globalization as it exists in the contemporary society. Delicate issues like hybridity, insurrection, migration, intercultural correspondence, personality emergency, depression, multiculturalism, racial separation, social authenticity, and look for home additionally discover articulation inside the ambit of her books. Her work likewise centers around the concealment of ladies in India. Kiran Desai's works present not just a colourful picture of individuals from various nations, their battles, clashes, dreams and disappointments, yet in addition a develop comprehension of life at different dimensions.

Most of the characters of Desai's have been stuck by distance or separation. The primary characters the judge, Sai, and Biju live in two universes: the Indian class framework and the Western world. Set against the setting of rising rebellion in Nepal, the present novel likewise follows lives of individuals who are compelled to stand up to their impacting advantages with the experience of the insurgency and disorder in the environment. The epic features the distinctions and likenesses between the Nepali outsiders in India and Indian workers in the USA.

The account of *The Inheritance of Loss* is about an adolescent Indian young lady, Sai, living with her Cambridge-taught Anglophile granddad, a resigned judge, in the town of Kalimpong a residential community in northern India adjacent to the Himalayas. Sai is the correct reproduction and the living embodiment of rootlessness in the contemporary society. At the point when Sai's folks' relationship went to the notice of the Judge, Sai's granddad he essentially separated his association with his little girl. Her dad a trying space explorer, who was going to be the primary Indian to fly into space was murdered in a street mishap in Russia, making her a vagrant. Prior to living with her granddad, Sai lived in a religious circle school. Her religious circle made her a westerner and an outsider in her own property. At the religious circle school, she learned English just as Western qualities and energy about everything English. She is solid and eager.

Sai finds out about her special life and she feels remorseful. She becomes hopelessly enamoured with Gyan, her arithmetic guide, however he is from a lower class. Be that as it may, Gyan, the relative of a Nepali Gurkha soldier of fortune, despises the middle-class way of life of the judge and Sai. He considers Cho Oyu, the place

of the judge as image of pioneer headache. He was flabbergasted and astonished the way Sai was quick to observe Christmas. He burst out one day, "For what reason do you observe Christmas? You are Hindus and you don't observe Id or Guru Nanak's birthday or even Durga Puja or Dussehra or Tibetan New year." (Desai: 163) To him Sai happens to be "an impression of the considerable number of inconsistencies around her." (Desai:262) He believed that a few people like Sai and the judge even after freedom still affected by pioneer rule. He is gotten between Sai's Love and GNLF, however at last felt his relationship with a gathering of ethnic Nepalese agitators could really compare to his energy for Sai. The furious takeoff of Gyan shows the lasting loss of Sai's affection and darling.

Desai in a parallel account draws out the binds of Biju, the child of Sai's granddad's cook, an unlawful outsider in New York. Often, other than survival, Biju's principle challenge is avoiding the experts, moving starting with one sick paid employment then onto the next. His most extreme want in life is to acquire the green card in America. Desai deftly moves between the main world and the third uncovering the agony of outcast, the vulnerabilities of post-expansionism and the desire for a superior life.

The majority of Desai's characters have been stuck by distance or separation as referenced before. The principle characters the judge, Sai, and Biju live in two universes: the Indian class framework and the Western world. Consistently these two universes are related in their social co-operations, their desires and expectations. "He withdrew into an isolation. The isolation turned into a propensity and it pulverized him into a shadow" (Desai:39). The judge turns into a casualty of twofold cognizance which implies division of character into a few aspects. "He begrudged the English—He abhorred Indians" (Desai:119). The Judge takes a gander at the English as somebody predominant and this frame of mind places him in a postcolonial issue that irritates his undecided nature.

Jemubhai delivers retribution on his initial disarrays and shames for the sake of keeping up principles. He needs to keep his inflection behind the veil of quietness. He works at being English with dread and scorn, however he needs to keep up a false pride for a mind-blowing duration by covering his genuine personality. The acknowledgment of social chain of importance prompts some persevering individual difficulties bringing about personality emergency. He pursues the British culture aimlessly. He gets enrolled as an Indian Civil Service part and attempts to wind up an official keeping up the British models. It obviously demonstrates his attitude that Britain speaks to a general public better than that of India. Homi Bhabha keeps up that the amazing impact of an alternate culture will cause a strain between the craving of character stasis and the interest for an adjustment in personality; and mimicry speaks to as a bargain to this pressure (Bhaba: 86). 'Mimicry of the inside', as Ashcroft claims, is "the fringe to submerge themselves in the imported culture, denying their causes trying to end up 'more English than the English'" (Ashcroft: 4). The equivalent is the situation with the judge. He ponders hard just to get increasingly familiar with Western culture and attempts to receive the British models in his day by day life. He takes tea each evening, attempts to communicate in English like a local speaker, covers his darker skin shading with the powder puff. He is dependably in a quandary, a battle of personality. Every one of his endeavours to discover a place among the individuals who are in the inside are worthless. Even though he holds an exceptionally renowned position like ICS, he should work just to fortify the control of Britain.

Sai is additionally a casualty of conditions. She lost her folks in a mishap in Russia when she was in a religious circle in Darjeeling. In this way, she has just tasted unpleasant sentiments of division and removal. She lands at the place of her granddad, a resigned Judge whom she has never met. Sai's craving to accomplish a sort of passionate bond with her granddad, likewise fizzles, for he himself is dislodged sincerely and physically. The pressure between needing to have a place with his own local land and a remote culture in the meantime, is the typical post-pilgrim problem. The primary night when Sai was at Cho Oyu at her granddad's home "she had a dreadful sentiment of having entered a space so enormous it achieved both in reverse and forward" (Desai: 34). Desai regularly utilizes the double contrary energies like entries and takeoffs moving in and moving out, expectation and misery all piece of the postcolonial quandary. Sai's dislodging from the solaces of a religious community school in Darjeeling to the lavish, foggy Himalayan locale of Kalimpong in North Eastern India, where a developing Nepalese uprising is going to unwind her life further, acquires a ton of ruin her life.

On account of Gyan, Sai's arithmetic coach, it is separation from Nepal that makes him undecided. He additionally faces the issue of way of life as he adores Gurkhaland yet does not battle for it. His adoration for Sai is likewise undecided and unverifiable. The affection among Sai and Gyan however blooms in the first place, it bites the dust when Gyan joins the radicals and quits coming to see her. In the long run he felt that Sai is more English than local. He discovered that she could talk just English and pidgin Hindi. She is limited to just high-class group of friends. Her failure to eat sustenance with hands, her extravagant for English vegetables peas and beans and her dread of Indian vegetables makes him detest her. Her visits to sanctuary are just to value

their structural tastefulness and Gyan feels that she ought to be embarrassed about for her absence of nativity. Later they get estranged from one another because Gyan didn't care for her pilgrim peculiarities.

The mutual chronicled heritage and a typical affair connect these evidently differentiating characters. Desai alludes to hundreds of years of subjection by the financial and social intensity of the West. She felt certain moves made long back had created every one of them. The judge's past is reflected through the continuous flow and blaze back methods. The judge dependably likes to be dealt with like a Westerner. He left India to think about in England when he was a young fellow. When he came back to India, he turned into an outsider. Although he seems, by all accounts, to be an Indian, carries on like a Westerner. The future judge as an understudy was secluded in supremacist England.

Be that as it may, on his arrival to India, he winds up scorning his evidently in reverse Indian spouse. "He would show her similar exercises of depression and disgrace he had learned himself." (Desai: 170). Kiran Desai discovers how poor people and the jobless relocate toward the western world for a superior life however endure a great deal because of racial bias, misuse, social persecution, distance, dislodging and thwarted expectation. Biju goes to America to get away from the class framework since he was naturally introduced to the lower, or hiring class in India. He has desires that in the Western world he will be dealt with in an unexpected way. In any case, he before long discovers that America has its own kind of containment called monetary subjugation. Amid his stay in the United States, Biju does not surrender his Indian character. Biju has seen the underground society in the cellars of America and has a progressively target information to survey the two societies. His life in America represents the unnerving existence of the illicit settlers and their troubling encounters in an impossible to miss condition. Desai investigations in her novel how even in the post-provincial occasions individuals from colonized nations confront destitutions in a nation like United States which is prestigious for majority rules system.

Biju arrived in America to obedient his dad's fantasy with phony reports. The tale portrays Biju's partiality to innovation however the West uncovers to him the cluttered and the savage side. Biju is stunned to see Indians requesting meat in New York eateries. This makes him appal towards this dislocated circumstance: "One ought to not surrender one's religion, the standards of one's folks and their folks previously them. You needed to live as per something" (Desai:143). This aversion is somewhat clearer when later Biju winds up mindful of his misuse. He demonstrates his outrage to the manager in any case, he was attachment to advancement in the western culture.

In an outside land he faces abuse and affront as an illicit foreigner. He was additionally paid an exceptionally small pay regardless of working for extend periods of time. As an unlawful interloper he moved from eatery to eatery for better pay and regard. Still he yearned for a green card however his fantasy did not turn into a reality. Kiran Desai portrays clearly the insightful of socially and verifiably huge occasions occurring in the postcolonial period in her novel. She draws out the path uprising at Kalimpong has prompted removal of a few people and tosses light on how in the postcolonial circumstance the minimized or the abused turn into the attacker. In *The Inheritance of Loss* Kiran Desai portrays the socio-political circumstance in Kalimpong as a result of colonization. This sort of circumstance affected half-taught, young fellows like Gyan to participate in nearby political tumults in their scan for better living conditions. He joins an ethnic patriot development principally to vent his anger and disappointment. "Old abhorrence is unendingly retrievable," Desai reminds us, and they are "cleaner . . . since the melancholy of the past was gone. Simply the fierceness remained, refined, liberating." (Desai: 81.)

Desai's tale features the view that multiculturalism is confined to the cosmopolitan urban areas of the West, yet it couldn't give any answer for the current reasons for radicalism and brutality in the creating nations like India. It doesn't propose, regardless of whether monetary globalization can clear the way to success for the oppressed. Desai's primary thought is that benefit could be appropriated among countries, cooperating.

The real subject running all through the novel is the one firmly identified with the impacts of expansionism and the situation in post-imperialism period, the loss of personality and the way it goes through ages as an unpleasant feeling of misfortune. Desai features most of the exceptional issues of contemporary society in her novel. Along these lines, Kiran Desai's fearlessness, dedicated perspectives on psychological warfare and shortcomings of a destitution-stricken society are authentic and striking. What's more, she concentrates on estrangement, social conflict, uprooting, banish, misuse, financial disparity, fundamentalism, globalization, hybridity, insurrection, and movement, loss of personality, forlornness, multiculturalism, destitution and racial-separation.

Kiran Desai brings the new thought for her novel by uncovering the socio-political clash in Kalimpong. She portrays the uprising exercises in Kalimpong where the Indian Nepalese requested a different state for themselves amid the 1980s. The Goorkha National Liberation Front has been shaped fundamentally by the Indian Nepalese youth who are tired of their minority status in a place where they are in the greater part. They need their own nation to deal with their very own issues. The Gorkhas think about that it is their bequest to battle for a different country as they and their ancestors have yielded a great deal for India. Desai has featured this perplexing picture of psychological oppression and political self-hardship as the most exceedingly terrible political strife in the post-current time.

One of the real worries in postcolonial writing is the issue of uprooting and its outcome bringing about the loss of home. Evacuating from one's very own way of life and arrive, and the miseries of re-directing in an outsider land are delineated in numerous postcolonial works. The characters in *The Inheritance of Loss* frequently confront the issue of personality and estrangement and end up disappointed toward the end. Notwithstanding when they return to their own nation, like the Judge in the novel, they build up a feeling of doubt and outrage. They stay in a mess from which they think that it's hard to turn out.

The Inheritance of Loss is a narrative of misfortune that one must face because of conditions of one's life. The greater part of the characters, particularly the central characters must face misfortunes in life due to their diasporic presence. Right off the bat, Sai, who has endured the loss of her folks' demise at an early age, is likewise deprived of adoration and love from her granddad, the Judge. The romantic tale of Sai and her Nepali arithmetic mentor, Gyan, endures a blow with the Nepal uprising.

As a post-pioneer writer, Desai has portrayed misfortunes at the individual dimension as well as in the bigger ambit of the general public. The epic even pictures the neediness stricken innate individuals of Zanzibar. Truth be told, destitution itself is an incredible death toll. The locals of poor countries are likewise at a misfortune as they confront neediness and abuse in another nation. The cook is severely treated by the Judge simply because he is poor. All that he gets in lieu of his twenty-four hours of administrations is simply the minimal expenditure that he spends on himself. The cook now and then even needed to endure the Judge's evil treatment. When he protested that it is horrible to be a destitution-stricken man.

Misfortune can likewise be found in Lola's life. She carries on with a calm existence with her sister Noni, however the tumult that emerges in Kalimpong leaves an enduring impact on her. She grieves the loss of her significant other. The Goorkhaguerillas assault, Mon Ami and her property. They additionally mortify her. Father Booty, another unfortunate casualty, is a Swiss, yet he views himself as an Indian non-native. His property has been reallocated by a Nepali specialist as Father Booty's visa is lapsed.

In this novel, *The Inheritance of Loss*, youngsters lose their feeling of legacy, having a place, their way of life and their unique home. Truth be told, the misfortune isn't just looked by one age yet by three ages. Aching is the feeling that the characters appreciate in this novel. They long for home, they long for affection, and they long for acknowledgment yet they couldn't satisfy any of them.

Multiculturalism is a trademark highlight of Indian culture. The greater part of Desai's characters has a place with various social foundations. She keeps up sincere mentality to all societies however gently uncovered the vanity and lip service implanted in their frame of mind to life. Migration is a standout amongst the most striking issues. The greater part of the Indians and the Third World Citizens face such issues in Europe and America. Biju, Saeed, Harish Harry, Saran, Jeev, Rishi, Mr.Lalkaka, and a large number of Africans, Latin Americans and Asians working in America and Europe encounter a harsh battle as settlers. Indeed, Kiran Desai has an energy for transforming the framework to disperse the hardships of the transient individuals. It is critical that the depiction of nature and scene involves an extensive lump of the novel.

What Desai at last features aren't simply singular encounters, yet rather the relations of acknowledgment among outsiders, outcasts, and non-natives. *The Inheritance of Loss* recounts the tale of two various types of Diasporas, the misused foreigners in New York City and a maturing, elitist bunch of Indians settled after retirement in a slope town. Characters having a place with both these sorts confront the difficulties of a globalized society that is full of progressively nonconformist and nationalistic plans. Desai's epic depicts human relocation and demonstrates that it has dependably been a piece of the human experience. Her practical depiction of life in the two landmasses, diasporic on numerous dimensions, shows a more profound comprehension of the human condition.

The Inheritance of Loss derides globalization and its outcomes. Pictures and depictions are to influence a joke of advancement to flourish all through the novel. Biju, when he achieved India is promptly overwhelmed by the

nearby ejections of anger and dissatisfaction from which he had been physically remote in New York. For him and the others, Desai proposes, withdrawal or getaway yet they are never again conceivable. She makes her novel *The Inheritance of Loss*, a stage to offer conversation starters on post-imperialism and globalization. The epic has globalization as its epicentre. Some of the time it's the West which is attempting to globalize its beliefs as on account of the judge and Sai and his Westernized neighbourhood. The loss of Father Booty, another imperative character in the novel, encapsulates the conundrum of globalism. He has lived in India for forty-five years and is an outsider to Europe. Be that as it may, he isn't an Indian national - he is a guest who has never connected for Indian citizenship and even has neglected to re-establish his working grant. In any case, he is an uprooted individual arranged into outcast to his local nation.

The Inheritance of Loss possesses large amounts of subjects that make it an intriguing social perusing. As Desai is a famous migrant author, her subjects are of human hardship, injury, character and detachment. In this novel she endeavoured to plunge profound into the ocean of human brain research. Carmen Wickramagamage 5 points out that a great many people imagine migration as an agonizing decision among osmosis and nativism. Desai investigates the two sides of the issue and eventually challenges the allure of digestion and the insight of looking after distinction, possessing the edges, and keeping away from, proud support in the New World. The tale disentangles a concealed touchy truth and destiny of the general population destined to encounter current life as a nonstop battle while adjusting similarly the pride and equity of their underlying foundations and their present presence.

Kiran Desai with her ostracize experience can appreciate the distress and enduring one needs to experience when one endeavours to settle down in an outsider land. She trusted that racial separation is a result of some narrow-minded individuals' political belief system. With her vision and social cognizance Desai recommends that all-inclusive resilience and shared regard can unquestionably bring widespread harmony and agreement.

The Inheritance of Loss features the fundamental human qualities like sympathy and resistance, while love outperforms the social, political and religious constraints. It is an interesting novel. It obviously demonstrates that Desai's basic knowledge is a piece of her education and experience. Her novel urges majority of ways to deal with issues of globalization, advancement and esteem frameworks.

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**VARIOUS ANOMALIES NOTICED AFTER INCORPORATING THE AUDITORY PARAMETERS
IN ACOUSTIC PARAMETERS IN FORENSIC SPEAKER IDENTIFICATION**

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ABSTRACT

Almost 100 speech samples (both for questioned and specimen) were studied in this case to extract the speech specific parameters (acoustic and auditory) and then finally, to correlate them statistically with one of the nine probability scales available. Major speech specific parameters used in this study are Formant Frequencies (F1, F2 & F3) at the particular location (acoustic parameters) and phonetic and linguistic features (collectively known as auditory features) are combined with each other by developing the software exclusively for this purpose; using the idea of Bayesian Likelihood Ratio. Various anomalies were noticed in the results as almost nine speech samples which otherwise should come in the Positive Identification scale using the conventional criteria, finally comes out be in Probable Identification scale using the new approach developed by the author because of less similar auditory features. Similarly, three speech samples which are aurally more similar than others, took the final result to the higher level probability scale; and many other similar kind of results are discussed at length in this paper. Combined potential of acoustic parameters, auditory features and Bayesian Likelihood ratio is tried to be tested in this study of Speaker Identification test by semi-automatic measurement to help law enforcement and ultimately, to the courts of law.

Keywords: Acoustic Parameters, Auditory Features, Bayesian Likelihood Ratio, Formant Frequencies, Phonetic and Linguistic features.

INTRODUCTION

In today's world, the evolution of Information and Communication Technology (ICT) authorizes efficient and effective communication between two or more persons. Before writing, human beings mostly relied on oral traditions for the flow of information. The oral culture greatly helps in documenting the traditions, cultural standards and knowledge of the localities. This era's exchange of information includes carrier pigeons, drums, smoke signals and runners. The continuous evolution and advancement in telecommunication makes communication faster, more accessible and efficient. With the invention of printing press and paper, written communication flourished. Subsequently, the discovery of telephone made long distance communication possible. With the advent of television, the real time witnessing of events happening in faraway places excites the imagination of common people.

Following that, dawn of recording devices made possible the idea of listening any audio and video communication at any later point of time with ease and comfort. At the same time, they are also used by anti-social elements to commit offences like bomb intimidation, stalking, kidnapping for ransom, bribery, terrorist activities etc. This situation exactly warrants the need for identifying the caller/speaker for the purposes of giving justice to the innocent. The science of Speaker Identification drew the attention of researchers in the first half of the 20th century by trying to produce the tridimensional spectra of the same vowel uttered by different speakers.

RESEARCH OBJECTIVE

In this paper, author had collected about 100 questioned speech samples as well as 100 specimen speech samples and noted their auditory features (linguistic and phonetic) and calculated acoustic parameters like Formant Frequencies (F1, F2 and F3) from speech spectrograms. After calculating these values, they are statistically correlated with one of the nine probability scales with the help of the software specifically designed for this very purpose. Authors discussed and carefully scrutinize the how the final probability scale (which comes after considering the Formant Frequency values only) shifts to upper and lower probability side when the values noted for auditory parameters also incorporated in the final result to calculate the probability scale.

LITERATURE REVIEW

Visual representation of the spoken words was developed by Alexander Melville Bell (1867). This was the earliest part of the development of the technique of the Speaker Identification in which the single word is represented as the visual display. It also demonstrated the minute differences with which different people utter

the same word. This analysis and display of speech sounds developed by him is termed as “visible speech” [9,10].

New word “Voiceprint” was coined when it was found that speech spectrograms were as unique and permanent as the fingerprints for an individual [12]. Semi-Automatic methods of Speaker Identification which involves both human element and machine analysis gained prominence over the methods that are wholly involves human subjectivity and on the other side, if it involves only machine analysis. Slowly, researchers tried to incorporate the statistical angle into Forensic Science investigation and called it as “Criminalistics” which further increases the reliability of the courts of law. C. R. Kinston and P. L. Kirk in 1964 deliberated about the different facets of the employment of statistics in criminalistics [14].

In 1967, Young and Campbell by employing the method of Kersta examined and tried to identify speakers from monosyllables spoken in context and hereby, concluded that different contexts decreases the identification ability of observers because of different spectrographs introduced by different phonetic contexts offset any intraspeaker consistency and shorter duration of words in context simultaneously decreases the amount of information available for matching [20].

Bolt et al in 1970, contended that similarity of spectrographic pattern of speech spectrograms depends primarily upon the movement patterns used to produce language codes, & indirectly or partially on the anatomical make-up of the vocal tract [6].

Wolf (1972) tested different sets of speech specific parameters, searching for the most efficient set, i.e., the one that could provide minimum intra-speaker variability and a maximum inter-speaker variability. He employed contemporary speech samples. He tested combinations of up to about 27 parameters extracted from vowel spectra, nasal consonants, word duration and glottal frequency, glottal sources spectrum slope and voice onset gaps. Discrimination decisions were based on computation of Euclidean distances among similar parameters of “unknown” and “known” samples. A 2% error of false identification in closed sets was produced using favorable combination of the parameters selected as the most efficient ones [19].

The following parameters were considered for the visual examination of spectrograms (Tosi et al., 1972); that is; mean frequencies and bandwidths of vowel formants, time duration of similar phonetic elements, energy distribution of fricatives and plosives, gaps and type of vertical striations, slope and transients of formants, and plosive gaps and interformant acoustic density patterns. These tests include almost every type - non-contemporary samples; open trials; trained examiner and high confidence decisions. The results concluded with an approximate error of 5% for false elimination and 2% false identification [18].

Semi-automatic method developed by Stanford Research Institute (Becker et al. 1972). Similar phonetic events and voice samples which had to be compared were selected by the examiner with the help of the electronic device. The speech sample matching was performed by using four different alternative statistical techniques: uniform weightings, F-ratio, $1/\sigma$ weighting, and likelihood ratio. This last method proved more decisive than the others. The examiner selected a threshold to produce decisions as to whether the two speakers compared were the same or different. The authors concluded that the system could yield 1% errors of false identification.

Hazen in 1973 reported an investigation performed to discover the effect of context on speaker identification and concluded that voice identification using spectrograms should not be utilized until sufficient and consistent data are gathered to establish accurately the limits of this technique. He performed an experiment on co-articulation and found that attempts at matching the same five words taken from different contexts yielded only 26% correct identification. This percentage was increased to 80% when comparing words extracted from the same contexts, keeping all other conditions of the experiment invariant [11].

C G G Aitken in 2000 used Bayesian Likelihood Ratio in combining different probabilities like the subjective and objective ones in a single formula [1].

D. Meuwly and A. Drygazlo in 2001 used the same likelihood ratio for indicating the merit of evidence of questioned sample recording and measured that how this recording settles for suspected speaker models when these are compared to the relevant non-suspected speaker models [16].

Yuko Kinoshita in 2002 investigates about the possibility to perform forensic speaker identification in real forensic conditions, with traditional acoustic parameters and Bayesian Likelihood Ratio and concluded that likelihood ratio based discriminant test was found to be one of the most effective ways in assessing the speech data [13].

In an Interactive Training Course on Forensic Speaker Recognition published in the CBI Bulletin, Vol.XIII as “An introduction to Forensic Speaker Identification Procedure” in 2005 by C P Singh, the verbal probability scales identified as are positive identification, identification with high probability, probable identification, possible identification, no opinion, possible elimination, probable elimination, elimination with high probability elimination and positive elimination [2].

RESEARCH METHODOLOGY

Words having same vowel quality from questioned and specimen speech sample as syllabic nuclei have been selected for the sampling purposes known as clue-words. Clue-Words are the words which are having the same vowel quality and are selected from the set of verbatim or non-verbatim words. These speech samples have been collected from actual crime samples assessed from the database from State Forensic Laboratories of Haryana and Delhi (India) without knowing the case particulars. These sets of clue-words includes different kind of vowels, namely, /ʌ/, /ɛ/, /ɑ/, /æ/, /a/, /u/, /i/, /ɔ/, /o/, /e/ & /ə/ which are succeeded and preceded by different consonants having similar places of articulation and these vowels are also recognized by International Phonetic Alphabets (IPA) 2015. The selected clue-words are specifically used to study the linguistic features, phonetic features and acoustic parameters. These questioned and specimen speech samples have been selected randomly with male, female ratio as 85:15 mostly in the age group of 15-60 years hailed from North India speaking mostly English, Hindi and Punjabi language. The speech samples have been obtained either from direct recording or mobile recording or by police interception. The selected clue-words were compared on one-to-one basis in closed sets while having two options i.e. of acceptance and rejection. All these speech samples have been digitized at the sampling rate of 22050 Hz and 16 bit quantization in mono signed [3, 4, 5].

Set of 100 clue-words for questioned as well as the specimen speech sample has been subjected to spectrographic analysis using Computerized Speech Lab-4500 (CSL-4500) to calculate the acoustic parameters. Formant Frequency (F1), Formant Frequency (F2) and Formant Frequency (F3) were analyzed using Linear Predictive Coding (LPC) at the particular location of the vowel nuclei. Similarly, for all these samples, their auditory features i.e. phonetic and linguistic parameters were noted. Speech specific parameters obtained by auditory analysis or critical listening (subjective analysis) of the speech samples like phonetic and linguistic features and acoustic parameters (F1, F2 & F3) obtained by spectrographic analysis (objective values) were used in this study and these were statistically correlated with one of the probability scale. Only the parameters which are found similar for questioned and specimen sample will be helpful in calculating the similarity percentage and dissimilarity percentage should be discarded in final correlation of probability on probability scale. For their correlation, the software is exclusively developed by the author so that the values obtained after spectrographic analysis successfully secure the incorporation of the values assigned to the auditory analysis and thereafter, accordingly, place them on the nine probability scales used prevalently in India and used in the Forensic Speaker Identification test [3, 4, 5].

The software is designed in such a way that Formant Frequencies (F1, F2 & F3) obtained by the spectrographic analysis have more weightage as compared to the values assigned to the auditory parameters. Reason being, objective data or machine analysis should get more credential than subjective data or critical listening. The entire software resides on the idea of Bayes' Theorem which states about how the final probability changes after new evidence comes into picture and has to blend with already available evidence. In this study, new evidence means data obtained from the auditory analysis and already available evidence is data obtained from spectrographic analysis. Finally, the numerical/statistical data obtained after blending subjective data with objective one will find a parallel with any one of the probability scales according to the criteria [3, 4, 5].

DATA ANALYSIS

Figures 1 represents the waveform alongwith the phonetic transcript of the words /təra/, /dʒijada /, /tenu/, /mɛ /, /dʌs/ in windows A & C and in windows C & D, correspondingly there are spectrograms and formant frequencies of the same words. Figure 2 represents their respective LPCs.

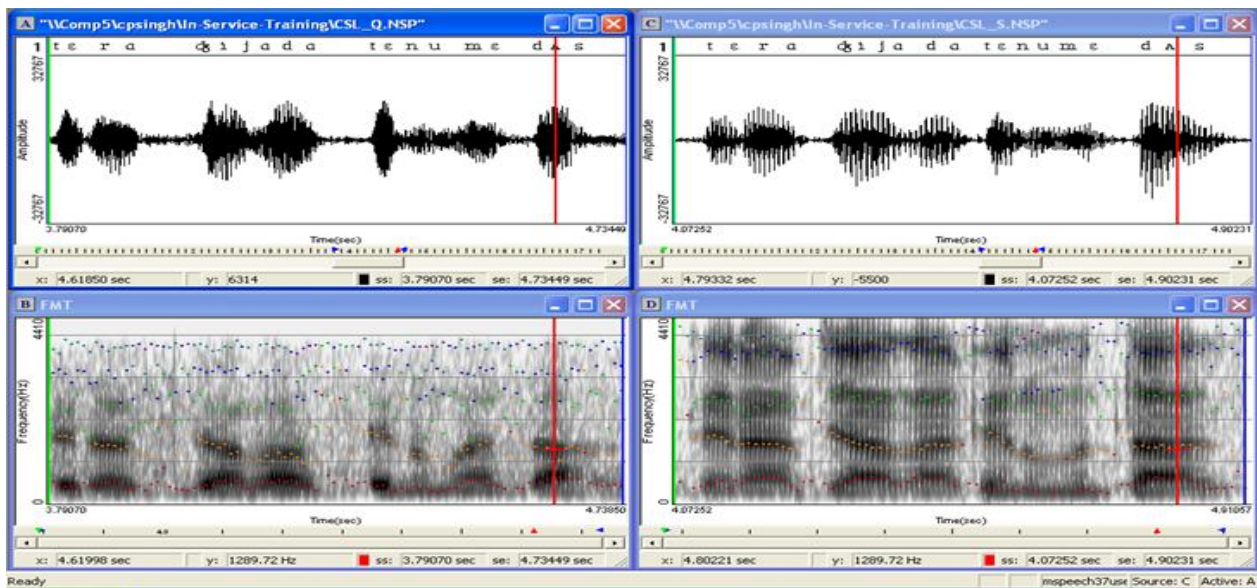


Fig-1: Waveform with phonetic transcript in windows A & C, their respective spectrograms with formant markings in windows B & D.

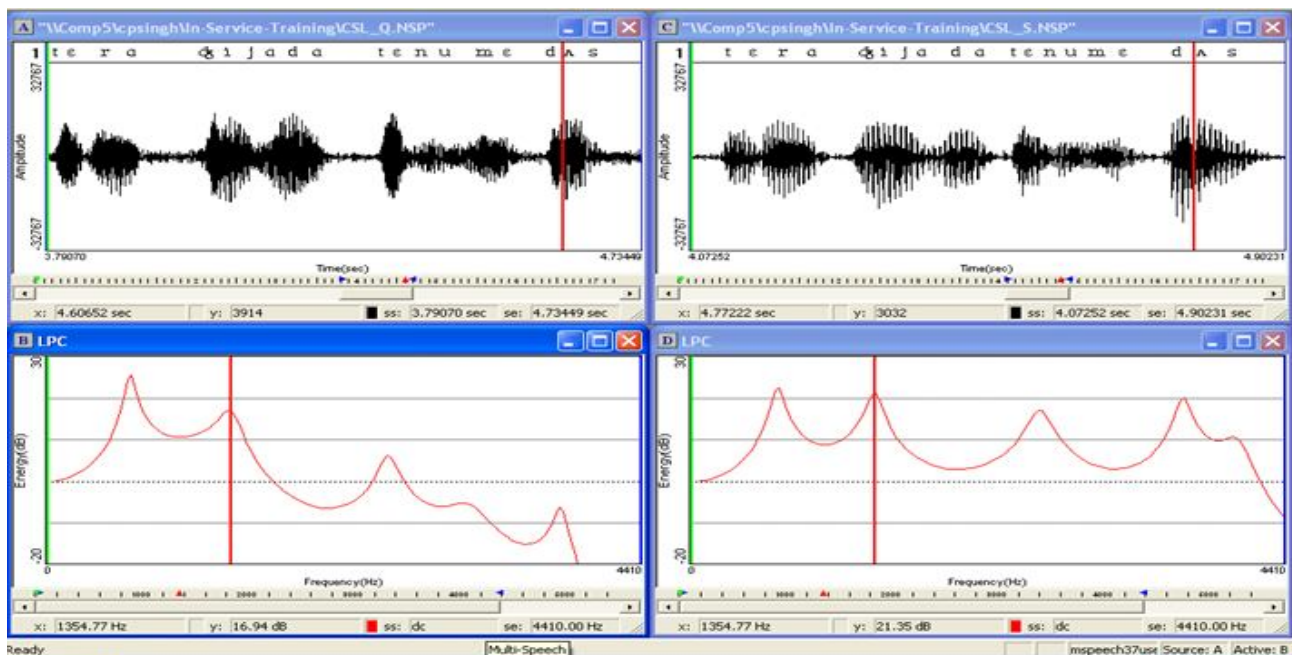


Fig. 2: Waveform with phonetic transcript in windows A & C, their respective LPCs in windows B & D.

If only values of acoustic parameters are taken into consideration, then 38 speech samples are Positively identified, 12 speech samples have High Probability, 47 speech samples are having Probable Probability and 3 speech samples have Possible Probability Identification as shown in Table 1.

Table-1: is the segregated compilation of no. of clue-words, no. of formants used, their similarity percentage for only objective analysis, also the final percentage after incorporating it with auditory feature values and the final probability on the probability scale

S. No.	No. of Clue-Words	No. of Formants	Probability	Objective Analysis Result (%)	Subjective Analysis Result (%)	Final Percentage (%)
1.	26	3	Positive Identification	93.75	85.71	92.14
2.	28	3	Probable Identification	81.72	85.71	82.53
3.	29	3	Probable Identification	88.57	78.57	86.57

4.	33	3	Probable Identification	88.03	92.85	88.99
5.	38	3	Probable Identification	82.17	85.71	82.87
6.	38	3	Probable Identification	83.33	92.85	85.23
7.	39	3	Probable Identification	82.40	78.57	81.64
8.	21	3	Probable Identification	84.52	92.85	86.19
9.	18	3	Probable Identification	79.62	85.71	80.84
10.	19	3	Probable Identification	81.81	78.57	81.16
11.	41	3	Probable Identification	81.66	92.85	83.90
12.	32	3	Probable Identification	89.21	92.85	89.94
13.	37	3	Probable Identification	83.73	92.85	85.56
14.	31	3	Probable Identification	89.52	71.42	85.90
15.	29	3	Probable Identification	88.54	92.85	89.40
16.	29	3	Positive Identification	94.25	78.57	91.12
17.	25	3	Probable Identification	84.52	85.71	84.76
18.	53	3	Probable Identification	90.19	85.71	89.29
19.	25	3	Probable Identification	87.77	92.85	88.79
20.	19	3	Probable Identification	86.36	92.85	87.66
21.	29	3	Probable Identification	83.33	85.71	83.80
22.	19	3	Probable Identification	86.11	92.85	87.46
23.	27	3	Probable Identification	82.14	78.57	81.42
24.	33	3	Probable Identification	86.66	85.71	86.47
25.	33	3	Probable Identification	89.81	85.71	88.99
26.	32	3	Probable Identification	84.76	92.85	86.38
27.	33	3	Probable Identification	80.83	92.85	83.23
28.	35	3	Positive Identification	90.35	92.85	90.85
29.	24	3	Probable Identification	89.65	85.71	88.86
30.	23	3	Probable Identification	90	78.57	87.71
31.	26	3	Positive	93.33	92.85	93.23

			Identification			
32	31	3	Probable Identification	89.18	92.85	89.92
33.	18	3	Identification with high Probability	92.75	85.71	91.34
34.	18	3	Identification with high Probability	93.33	92.85	93.23
35.	33	3	Probable Identification	90.83	71.42	86.95
36.	16	3	Identification with high Probability	93.33	85.71	91.80
37.	29	3	Positive Identification	91.39	92.85	91.68
38.	30	3	Probable Identification	85.85	92.85	87.25
39.	24	3	Probable Identification	88.88	78.57	86.82
40.	33	3	Positive Identification	90.35	92.85	90.85
41.	24	3	Positive Identification	89.74	92.85	90.36
42.	32	3	Probable Identification	91.66	78.57	89.04
43.	26	3	Positive Identification	91.39	92.85	91.68
44.	20	3	Probable Identification	88.40	78.57	86.43
45.	23	3	Probable Identification	92.59	71.42	88.35
46.	21	3	Positive Identification	93.33	85.71	91.80
47.	30	3	Positive Identification	92.47	85.71	91.12
48.	28	3	Positive Identification	92.22	92.85	92.34
49.	25	3	Positive Identification	93.82	92.85	93.63
50.	25	3	Probable Identification	87.61	71.42	84.38
51.	27	3	Probable Identification	90.63	78.57	88.21
52.	17	3	Identification with high Probability	92.59	92.85	92.64
53.	27	3	Probable Identification	89.24	85.71	88.54
54.	27	3	Probable Identification	91.42	71.42	87.42
55.	14	3	Possible Identification	93.75	92.85	93.57
56.	19	3	Identification with high Probability	93.33	85.71	91.80

57.	30	3	Positive Identification	93.16	92.85	93.10
58.	28	3	Positive Identification	94.87	78.57	91.61
59.	28	3	Positive Identification	93.33	85.71	91.80
60.	24	3	Probable Identification	92.30	78.57	89.56
61.	16	3	Identification with high Probability	94.73	71.42	90.07
62.	15	3	Possible Identification	92.15	92.85	92.29
63.	18	3	Identification with high Probability	93.65	92.85	93.49
64.	22	3	Positive Identification	91.30	92.85	91.61
65.	36	3	Positive Identification	91.89	85.71	90.65
66.	23	3	Positive Identification	92.30	92.85	92.41
67.	34	3	Probable Identification	90.74	85.71	89.73
68.	13	3	Possible Identification	95.23	92.85	94.76
69.	31	3	Probable Identification	87.5	92.85	88.57
70.	28	3	Positive Identification	90.74	92.85	91.16
71.	24	3	Positive Identification	91.95	85.71	90.70
72.	19	3	Identification with high Probability	89.39	92.85	90.08
73.	35	3	Positive Identification	92.10	92.85	92.25
74.	19	3	Identification with high Probability	93.93	92.85	93.72
75.	23	3	Probable Identification	88.50	92.85	89.37
76.	16	3	Identification with high Probability	94.73	85.71	92.93
77.	26	3	Probable Identification	89.81	78.57	87.56
78.	21	3	Probable Identification	89.33	85.71	88.60
79.	23	3	Probable Identification	87.17	92.85	88.31
80.	19	3	Probable Identification	86.36	92.85	87.66
81.	37	3	Probable Identification	86.17	92.85	87.51
82.	18	3	Identification	94.20	92.85	93.93

			with high Probability			
83.	25	3	Probable Identification	84.52	92.85	86.19
84.	25	3	Positive Identification	94.25	92.85	93.97
85.	23	3	Positive Identification	91.35	92.85	91.65
86.	28	3	Probable Identification	89.89	85.71	89.06
87.	17	3	Identification with high Probability	94.44	78.57	91.26
88.	34	3	Probable Identification	91.22	64.28	85.83
89.	24	3	Positive Identification	91.35	92.85	91.65
90.	41	3	Probable Identification	88.14	85.71	87.66
91.	22	3	Positive Identification	92.30	92.85	92.41
92.	24	3	Positive Identification	89.58	92.85	90.23
93.	27	3	Positive Identification	90.99	92.85	91.36
94.	35	3	Positive Identification	91.86	92.85	92.06
95.	26	3	Probable Identification	88.17	92.85	89.10
96.	30	3	Positive Identification	91.89	85.71	90.65
97.	29	3	Probable Identification	89.52	78.57	87.33
98.	29	3	Positive Identification	93.33	92.85	93.23
99.	17	3	Identification with high Probability	92.59	85.71	91.21
100.	29	3	Positive Identification	90	92.85	90.57

This is the conventional criteria; according to which if there occurs three or more usable formants to the satisfaction of the expert, more than 20 word segments and 90% of the word segments are similar spectrally, then this kind of speech sample will be identified as having **Positive Identification**. Similarly, if each word segment must have two or more usable formants, having more than 15 word segments and 90% of the word segments are found to be very similar spectrally, then this speech sample is known as **Identification with High Probability**. On the other hand, if there occurs three or more usable formants to the satisfaction of the expert, more than 15 word segments as minimum number of matching words and 80% of the word segments are similar spectrally, then this kind of speech sample will be identified as having **Probable Identification** and similarly, with three or more usable formants are there for the expert, more than 10 similar matching word segments and 80% of the words must be very similar spectrally, then we have **Possible Identification** as the final probability [2].

RESEARCH FINDINGS

Now, **according to the present research**, if the values assigned to the auditory features (phonetic and linguistic) are also incorporated with that of the acoustic parameters with the help of the software by incorporating the idea of Bayes' Theorem, then the number of samples having **Positive Probability**

Identification comes out to be 31, 13 having **Identification with High Probability**, 53 speech samples are having **Probable Identification** and 3 speech samples are having **Possible Probability**. These are the final probabilities which the author has obtained after blending auditory features with that of the acoustic parameters.

Nine speech samples i.e. speaker no. 18, 30, 35, 45, 51, 54, 60, 67 and 88 are found to be aurally less similar as compared to the acoustic features of the other samples which are on Positively Probability scale according to the conventional criteria and the other remaining samples are found to be more similar in acoustic as well as auditory features. Speech sample no. 72 will otherwise be admitted as on the Probable Probability scale if traditional method is to be used but its auditory features are found to be more similar (for questioned as well as specimen speech sample) which drags the final probability in this case to one higher up level i.e. High Probability Identification. Auditory features of speech samples no. 41 and 92 are also more similar than acoustic parameters which make these samples as having Positive Probability instead of Probable one. In all the three Possible Identification results i.e. sample no. 55, 62 and 68, there found an astounding similarity aurally as well as spectrally.

Auditory features used for analysis in the examination process and the interface which was employed after the development of the software using the idea of the Bayes' Theorem is shown in the Figure 3.

OBSERVATION SHEET-SPEAKER IDENTIFICATION

Case No :	1	
Marking of Speaker:	Questioned:	
	Specimen:	
Medium of Recording:	Questioned:	
	Specimen:	
Any Other Information:		
Recording Mode:	Questioned:	
	Specimen:	
Nature of Criminal Offence:		
Quality of Speech Sample:		
Linguistic Features:	For Questioned:	For Specimen:
	Stylistic Impression Normal	Stylistic Impression Normal
	Delivery of speech Medium	Delivery of speech Medium
	Phonation Medium	Phonation Level
	Physiological pitch level Medium	Physiological pitch level Medium
Articulatory speech:	For Questioned:	For Specimen:
	Flow of speech (qualitative) Easy	Flow of speech (qualitative) Easy
	Flow of speech (quantitative) Normal_Fluent	Flow of speech (quantitative) Very_Fluent
	Plosive Formation Medium	Plosive Formation Medium
	Nasality Normal	Nasality Normal
Prosodic Analysis:	For Questioned:	For Specimen:
	Intonation pattern Level	Intonation pattern Level
	Dynamic of Loudness Medium	Dynamic of Loudness Medium
	Speech Rate Medium	Speech Rate Medium
	Speech Variation Medium	Speech Variation Medium
	Striking time features Compression of words/Compression of Statement	Striking time features Compression of words/Compression of Statement
	Pauses Normal	Pauses Normal

Voice Impairment:		
Temporal Measurement: (Sample Duration)	Questioned: 5.5 sec	Specimen: 5.6 sec
Temporal Measurement: (Speaking Rate)	Questioned:	Specimen:
Temporal Measurement: (Phonation- time P/T ratio and speech time S/T ratio)	Questioned:	Specimen:
	Pauses	Speech Bursts
Spectrographic Analysis:	Questioned: tik, ja, kəl, nɛi, pɛ, se, dal, pa, ja, kɔi, bat, bəhʊt, ink, vajri, tum, kahan, ghɛr, su, bəh, pu, ra, ɛ:re, ɔ:fis, kam, tsɔri, a:p Specimen: tik, ja, kəl, nɛi, pɛ, se, dal, pa, ja, kɔi, bat, bəhʊt, ink, vajri, tum, kahan, ghɛr, su, bəh, pu, ra, ɛ:re, ɔ:fis, kam, tsɔri, a:p	
Final % Age:	92.142857142857	
Formants:	3	
Result:	Positive Identification	

Fig-3: represents values selected for Linguistic and Phonetic Features, duration of speech sample, clue-words, no. of formants, their final similarity percentage after calculating objective and subjective results and the final probability as on verbal probability scale

CONCLUSION

For arriving into a conclusive opinion for Speaker Identification test, conventional criteria is what followed by experts in many countries. In India, it is on 9 probability scales and in some countries, 7 or 5 scales are followed. A new approach is attempted in this study to arrive at the verbal probability scales by incorporating auditory features with that of the acoustic parameters by using the design of the Bayes' Theorem. In this study, it was observed that almost 9 speakers having Positive Identification test with acoustic parameters are found to be less similar auditorily and therefore, the examiner has to conclude them to the lower probability scale i.e. Probable Identification scale. In High Probability Identification scale, there found a very good vowel quality as we have gained almost more than 90% similarity but due to less number of the word segments/clue-words, examiners have to co conclude them to this scale instead to the Positive Identification scale.

Almost more than half numbers of speakers are concluded to the Probable Identification scale. Results are arrived in this scale despite having more number of clue-words but somewhat quite less degree of similarity either in auditory features or in acoustic parameters. But a remarkable similarity is observed in all the three Possible Identification results, almost touching to 95% in one case. This is because of sufficiently high vowel quality present but due to less number of clue-words available, the examiner is forced to conclude them to the Possible Identification scale which should otherwise be a fit case to conclude to Positive Identification scale result.

The semi-automatic measurement of Speaker Identification test enjoys adequate credibility and is one of the most acceptable technique among the scientific community. This study brings combined potential of acoustic parameters, auditory features and Bayesian Likelihood ratio in Speaker Identification test which is certainly will be of great help for the law enforcement and subsequently to the courts of law. Thus, this method of arriving to the conclusion is promising one and can substitute the existing interpretation of the results in Speaker Identification test.

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A CONCEPTUAL FRAMEWORK FOR MEASURING EFFECTIVENESS AND BENEFITS OF “FLIPPED LEARNING”

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ABSTRACT

The objective of this research paper is to explore the dimensions of “flipped learning” and to propose a conceptual framework to measure the effectiveness of flipped learning in higher education in India. After the extensive review of related literature accessible, the eight major dimensions of “flipped learning” and six most significant “Benefits of flipped learning” were identified that have possibly significant impact on “Effectiveness of Flipped Learning”. This study is based on secondary data. An extensive and systematic review of literature related to flipped learning from various secondary data base has been undertaken. The study is limited to the published research work that is available in the selected databases, it is the main limitation of this document. There may be some published articles that could not get our attention.

Keywords: Flipped Learning, Flipped class, Edutainment-enjoyable, Higher level learning

INTRODUCTION

“Flipped Learning”—also referred to as “Flipped Learning”—extends the typical three-hour learning beyond the confines of classroom time through the use of online platforms. In “Flipped Learning”, part or all of direct instruction is delivered through videos and other media; and the class time is used for engaging students in collaborative, hands-on activities (“Flipped Learning” Network, 2014). Many colleges and universities have embraced “Flipped Learning” model as it provides opportunities for increased peer interaction and deeper engagement with the material (Johnson, Adams Becker, Estrada & Freeman, 2015). This pedagogical approach has gained such popularity in higher education that “2015 NMC Horizon Report listed” “Flipped Learning” to be adopted in a large scale in 1 year or less (Johnson et al., 2015). According to a survey conducted by “Center for Digital Education and Sonic Foundry”, 29% of the higher education faculty in the US reported to be currently implementing “Flipped Learning”, and 27% reported to be planning to implement it in near future (Bart, 2013).

OBJECTIVES OF THE STUDY

- To identify the dimensions of effectiveness of “Flipped Learning”
- To identify the benefits of “Flipped Learning”
- To propose a conceptual framework for measuring effectiveness and benefits of “Flipped Learning”

LITERATURE REVIEW

The Flipped Classroom Defined

The “flipped classroom” approach uses two distinct phases: (1) introduction of course content and delivery at one's own pace and time (often provided online). Course content is presented as readings, videos, graphic presentations or tests (Lavelle et al., 2013, Blair et al., 2016, Hanson, 2016). Students get involved with this material at their time and pace. (2) These “conferences” are followed by workshops where students are involved with the materials of the recently taught course (Bishop and Verleger, 2013). The workshop sessions often include elements of interactive, collaborative and applicative participation with the content of the course and solidify the concepts provided by the materials (Lavelle et al., 2013, Bishop and Verleger, 2013, Hanson, 2016).

A commonly accepted interpretation of the “flipped class” is exemplified by the definition provided by Educause, which states that “the flipped or flipped classroom is a pedagogical model in which the typical elements of a class and the task of a course are reversed” (2012, p. 1). A simple definition has been associated with the model in which the lessons are recorded in video and / or audio recorded in advance by the teacher to pass class time resolution problems. Alternatively, “Flipped Learning”, as defined by the “Flipped Learning” Network (2015), describes: “A pedagogical approach in which direct instruction moves from the group learning space to the individual learning space and the resulting group space is transformed into a dynamic and interactive space, a learning environment in which the educator guides the students as they apply concepts and are creatively involved in the topic”.

The description of the “Flipped Learning” Network offers a broader perspective of what includes an overturned learning project. It suggests that in order for the model to offer better opportunities for deeper, more active and committed learning, the process of change must be deliberate, intentional and holistic. This definition of “Flipped Learning” expands the basic idea of reversing the dynamics of teaching and learning in the “flipped

classroom”, emphasizing that the opportunities for interaction in the "group learning space" are used and not taken with "direct instructions"

Students' Perceptions of the “Flipped Learning”

The students' perception of flipped teaching varies widely (Johnson and Renner 2012, Blair et al., 2016, Amore et al., 2014, Nguyen et al., 2015, Hanson, 2016). Blair and colleagues (2016) report that after the students participated in a “flipped classroom”, they were interested in a broader explanation of the methodology. Students' perceptions of the approach were strongly influenced by the quality of online material (Blair et al., 2016). Hanson (2016) noted that greater understanding through dialogue in the face-to-face component, a broader and deeper thinking, the ability to pause and reproduce the material of the online conference and the flexibility of time to avoid conflicting commitments and the Students also recognize a reduced sense: isolation and disconnection were all advantages of the approach. Several students have indicated that the “flipped classroom” requires different pedagogical approaches to ensure a sustained and recognized academic performance that the general approach requires students' self-discipline. Something unexpected, the students also recognized that the investment approach was more efficient than the traditional lecture approach (Blair et al., 2016, Nguyen et al., 2015, Hanson, 2016, O'Flaherty and Phillips, 2015b).

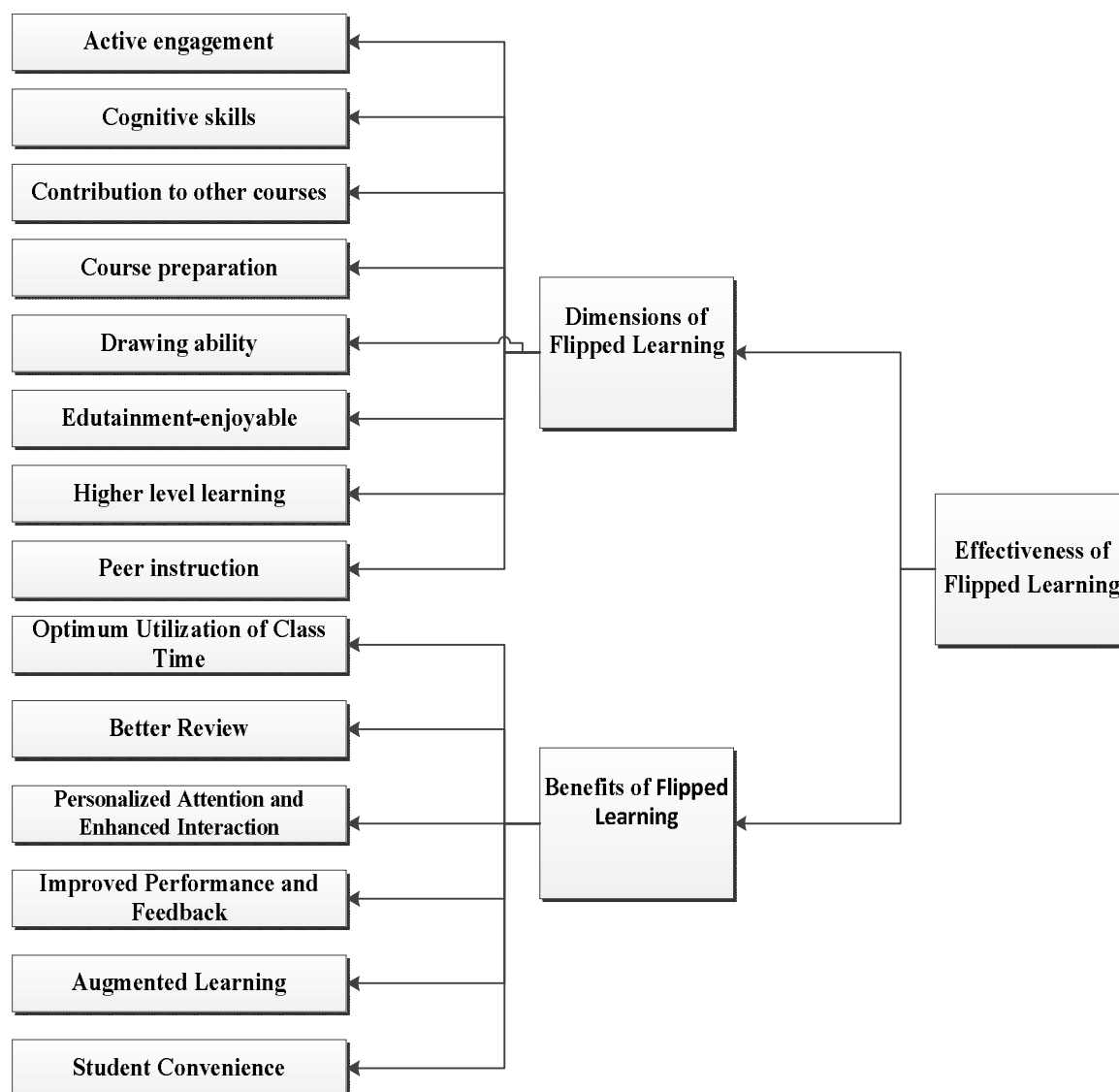
Benefits and challenges of “Flipped Learning”

The “Flipped Learning” approach seemed promising in terms of the benefits it offers to students and instructors. For example, only one study included in this review analyzed how students interacted with each other during face-to-face problem sessions and learned how their conversations went from simply remembering facts to conceptual discussions (Lin et al. ., 2014). Further research that investigates the engagement and interaction of students in face-to-face sessions would help instructors who have doubts about individual contributions in collaborative group tasks.

Some of the challenges, such as heavy workload and technical problems, can be addressed effectively. Instructors may be advised to gradually convert their courses instead of doing it all at once, since material development can be overwhelming. Although it may not be plausible to foresee all technical problems, making students aware of potential problems could reduce frustration. On the other hand, some other challenges raise some crucial concerns about the design of a “flipped classroom”. Studies that have found a lack of participation in the overturned format do not seem to make full use of it (for example, Ossman& Warren, 2014; Velegol et al., 2015). Online materials should be designed with care and complex problems, in which students are required to collaborate and interact with each other and with the instructor, should be assigned for class sessions. This would increase the frequency and commitment of the class, according to studies by Chen et al. (2014) and Rutkowski (2014).

THEORETICAL FRAMEWORKS FOR MEASURING EFFECTIVENESS OF FLIPPED CLASSROOM LEARNING

The theoretical basis of the flipped class is that students receive a personalized instruction adapted to their individual needs (Akey, 2006, Eldredge, 1990). The teacher who has a hundred students in a course does not have the opportunity to establish a personalized education in the traditional educational context. The weakness of the traditional approach is that all students have different knowledge about a specific topic, and not all of them come to class ready to learn (Eldredge, 1990).



EFFECTIVENESS OF THE “Flipped Learning”

An effective flipped class is that, the time normally used to teach, is used for classroom activities, discussions, problems and group projects. The most significant learning in a flipped class occurs following the efficient use of an additional lesson time (Tucker 2012). Direct instructions given to students as homework can take the form of a video, an article, a book, a power point, a booklet or a combination of these, among others. Any teacher who has had students who read materials before class to encourage discussions or activities, in a sense, used the “flipped classroom”.

The opinions in the educational community on the “flipped classroom” are varied. Some educators believe that the “flipped classroom” is the future standard of educational technique (Bergmann, Overmyer and Wilie, 2012). Other educators believe that the “flipped classroom” is a passing trend that will be considered an inefficient and undesirable form of education (Bergmann, Overmyer and Wilie, 2012).

DIMENSION OF EFFECTIVENESS OF THE “Flipped Learning”

Active engagement: Student participation implies both behaviors (attention, effort, etc.) and emotions (interest, enthusiasm, etc.) (Council, 2003). It includes student participation and active participation in classroom activities (Harris, 2011). Furthermore, commitment can be considered as the driving force of learning and is related to the personal investment of students that affects the quality of life of students (Harris, 2011, OECD, 2004).

Cognitive skills: Everyone thinks and an idea appears in someone's head, but it is difficult to organize and write on paper, if we do some writing activities in class, we can directly write our idea of thinking. "Writing is linked to cognitive skills (Freedman, Pringle and Yalden, 2014). With writing activities, the person refines and consolidates new ideas with previous knowledge. Furthermore, writing seems to improve the conservation of co-constructed knowledge (Rivard & Straw, 2000).

Writing skills require systematic training (Kellogg, 2008). In schools, unfortunately a large percentage of students never win this area because they do not write very often (Herr, 2008). In the flipped class, students have had opportunities for writing and presenting through various activities in the classroom. The above statement shows that the student's cognitive abilities have been positively influenced by the designed learning environment (flipped class).

Contribution to other courses:

If we think that in a short period, we will have an acting course next year, we can think ... as a proof for this". The curriculum is an important factor for education. In the instructions, the teacher uses specific study plans for each course. But, a course can not be considered independent of the other. In literature, it is called interdisciplinary (Schwarzer&Grinberg, 2017). In education, interdisciplinarity is the act of creating a connection between disciplines through education (Schwarzer and Grinberg, 2017). The curriculum, based on an interdisciplinary approach, supports a more relevant, less fragmented and stimulating experience for the student (Jacobs, 1989). It shows that some activities carried out in the environmental education course support different courses.

Course preparation:

How can it be said, for example, that we are studying before the lesson? Maybe not all of our friends study well, we all read at least once before starting a new subject and then doing class activities ... "Previous knowledge of students has important implications for learning and minimizes any confusion between types of similar information. Furthermore, it plays an important role in perception (Gredler, 2009). In the flipped class model, students gained basic knowledge before class. The statements show that previous studies are effective in preparing the course. And it has the potential to help minimize the confusing information related to the topic.

Drawing ability: Drawing can be seen as a way of expressing students' thoughts or ideas such as speaking or writing. At that point, practice is the key role of the advancement of any skill. And it had a positive effect on the ability to draw.

Edutainment-enjoyable: There should be new fun activities every week. Bisson and Luckner (1996) said that entertainment has four intrinsic characteristics. These are "relative", "situational", "voluntary experience" and the last "inherent to our nature". To provide a useful experience in the learning environment, fun in education should be linked to the topic (Baid and Lambert, 2010). The fun and the fun of the experience seem to be a motivation to attend the lesson (Lucardie, 2014). As can be seen in the literature, fun is an important factor for the class. In the flipped classroom, students have the opportunity to perform various activities. These activities support the fun and enjoyable learning environment.

Higher level learning:

"If we are studying in groups, each person who speaks his own idea and then discusses." Discussion helps us find what is best ... in other words, the last point of success is coming ... We are reaching the highest level of understanding ... the level of learning. "In education, the Bloom categories used to write learning objectives Bloom, Englehart, Furst, Hill and Krathwohl (1956) are classified into three categories: cognitive, affective and psychomotor domains have identified six levels that represent increasing levels of cognitive learning complexity, from the lowest level of knowledge to more advanced levels of analysis, synthesis and evaluation. The highest level of cognitive skills causes learning and deeper transfer (Adams, 2015). In the "flipped classroom model", the students communicated with the group friends, with the whole class and the teacher. Most of the class time was active. As evidenced, talking s Obre ideas and discussing in the classroom is a positive effect on the level of student learning.

Peer instruction: If we all do a group activity, all activities based on a collaborative educational model mean that if your friends do not want to do some activities, you have to warn them and continue to participate in the activities. ... you need to involve your friends for active participation. If I did not have enough information about my friends' knowledge on a topic, and they did not know about my knowledge, we share the knowledge together. "Winston and Zimmerman (2003), the effects of defined partners "exist when a person's behavior is influenced by their interaction with one or more people". From the student's expression, it is evident that students have an impact on the behavior of others. In the learning activity, group friends are obliged to carry out activities in the classroom. In addition, they share their information in the direction of their goals with their colleagues.

With peer education, students find the opportunity to interact with their friends during lessons and attention to concepts (Mazur, 1997). The flipped class model along with classroom activities seems effective to improve student learning under peer education.

BENEFITS OF “FLIPPED LEARNING”**Student Convenience**

A large number of students participate in various curricular / co-curricular activities or part-time jobs. The upside down classroom could offer a good alternative. The class shift ensures the convenience of learning for students participating in another way. Not only that, this technique also offers a classroom-free learning environment. This approach is based on its inherent flexibility to adapt to the specific learning styles of particular students. Students can watch videos / educational material at their own pace and time of day, which they deem appropriate.

Augmented Learning

One of the best learning methods is believed to be self-learning (Beder and Darkenwald, 1982). Therefore, by promoting self-learning, the converted classroom by default becomes an effective learning model. In addition, transforming the classroom around creates an inclusive learning environment that meets the individual learning needs of all students. This greatly improves the general learning of the class. Furthermore, learning through this model has also increased due to the greater availability of lesson time to reinforce learning that takes place outside the classroom.

Improved Performance and Feedback

A controlled classroom can reduce discipline problems, help teachers, provides more accurate feedback, and positively influences student achievement. These results are supported by the findings of previous studies, which indicate the same (Roshan, 2011). This result is an implication of the previous factor, which suggests that the flipped classes have a positive influence on learning. It is expected that this improved learning will manifest itself in improving student performance (Meyer, 2013).

Personalized Attention and Enhanced Interaction

This factor indicates that investing in the classroom can help teachers monitor the progress and performance of each student individually. This methodology can also help teachers improve the overall level of interaction. Not only is the teacher's interaction with the student better likely if this pedagogical approach is adopted, but it can also increase the level of interaction between students. Again, it is likely to have a positive influence on students' learning and performance..

Better Review

Through the class model flipped to provide instructions, the course content can be archived, so that it is available to students when necessary. Students can watch a video or participate in a virtual conference any number of times at the desired rate. This flexibility is likely to provide a better review of the course content.

Optimum Utilization of Class Time

When students arrive at the class previously exposed to the basic / memory elements of a particular course, they make lesson time available for intellectually stimulating activities / discussions. This ensures that lesson time is put into "best use". Previous studies have shown that this inspires and challenges students, encourages them to use higher-order skills that involve analysis and synthesis, and improves the general understanding of students (Krathwohl, 2002). Therefore, it can be said that by optimizing the use of lesson time, “flipped classrooms” favor an acute learning environment.

RECOMMENDATIONS FOR FUTURE RESEARCH AND PRACTICE

The systematic review serves as a basis for recommendations for educators who wish to study the role of “Flipped Learning” in higher education. Reforming education through theoretically solid frameworks, educational research should focus more on which specific aspects of active learning could be integrated into a “Flipped format” and how it could help train teachers and students for today's competitive global market and environment that changes jobs.

CONCLUSION

This systematic review of research on “Flipped Learning” in teacher education is timely as the “flipped approach” has gained popularity amongst educators. It is imperative to understand the current practices in order to shed light on future implementations. This paper attempts to propose a conceptual framework by recognizing a set of major dimensions of “flipped learning”. The framework shows the relationship between independent and dependent variable. After the extensive review of related literature accessible, the eight major dimensions of “flipped learning” and six most significant “Benefits of flipped learning” were identified that have possibly significant impact on “Effectiveness of Flipped Learning”. In addition, empirical study is considered necessary to examine the validity of the proposed framework.

A significant relationship is expected between the proposed fourteen “dimensions of flipped learning” and “benefits of flipped learning” in India. The major limitation of the present study is that it has been confined to published research papers from academic and practitioners which are accessible to us. There may be some articles which could not be brought to our attention, for this reason, explanation of the proposed conceptual framework in the present study may be to some extent limited.

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CASE STUDY: BRANDS VS FEATURES-INDIAN LUXURY CARS

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ABSTRACT

With the rise in income level and branding taking the forefront in the era of Social Media over use, the challenges of buying the car that you want versus status symbol are galore. The car industry in India has grown phenomenally, from being a binary one to the present day scenario where luxury cars on roads no more surprise the bystander, and looks like soon, they shall outnumber the other segments. The father-daughter duo in the case represent two schools of thought-wherein one is more inclined towards the brand of the luxury car whereas the other towards features. All that the both of them want is a perfect blend of brand value and features, and therein lies the challenge.

Keywords: Branding, Luxury cars, India, social media, features

1. INTRODUCTION

Kaashvi was the top of her class graduate from IIM-Ahmedabad, one of the top business schools in India. She had many offers from the top companies in India, which she had to weigh and decide before she even graduated from her college. Being a level headed girl that she was, she knew what she wanted. The time came for her to decide on the final two companies, to choose between the career that she wanted for herself with company A and the initial emoluments that she would receive at the start of her career, with company B.

She had been very close to her Dad and valued his advice. After discussing the pros and cons of both, she decided to let go the initial salary allurements to the career and chose company A. One year into the job, as they had both construed, she called her Dad to inform him that her probation was successfully over and had been confirmed with a good jump in her salary.

Both Kaashvi and her Dad were car geeks, so as they had always discussed, it was time for Kaashvi to upgrade her car. She had a reasonably good car, Hyundai Creta, Automatic, so the discussion started as to which should be the next one. Her dad was pretty convinced it should be the top brand luxury car for his daughter and Kaashvi knew that she wanted a real SUV. They both agreed that they would go for an entry level luxury SUV. The shortlisting started (table below)

Brand	Model-Automatic	Approx Price (2018) in lakhs Rs
Audi	Q3	37
BMW	X1	35
Mercedes	GLA Class SUV	34

The test drives of all the shortlisted vehicles began. The duo's analysis was that though Audi Q3 had high visibility on the road but it was very low on features, failing to provide even the basic like keyless entry and touch screen media. It seemed to them that the model is thriving in India as it carries the five rings on the front grill. Kaashvi was not quite sure yet as to whether the brand was worth the price. Her dad analysed it further that it is the 2014-15 model and hence is within the price range they were looking at. In 2019, the new model of Q3 might debut in India and like the trend has been, the price would increase manifold. So it might be her chance to own a Audi!

BMW X1 was good as well, but Kaashvi's SUV feel seemed a miss. GLA also didn't feel like an upgrade in space from her present car Creta. All the vehicles are excellent drives, though!

Meticulously both of them identified and analysed the features viz a viz, the brand. The price was within the same bracket so that isn't the concern when they are deciding on these three brands.

To confuse things further, since Skoda manufactures Audi and all Skoda cars in India, the Skoda Kodiaq was considered which got Kaashvi excited, since it's a seven-seater SUV in the similar price range of Rs. 36 lakhs (approx). It's loaded with creatures difficult to ignore, not only cosmetic but also security ones (9 air bags as compared to 6 in all the above models). The drive was awesome too, what it lacks is the brand value associated with the Audi, BMW and Merc. Kaashvi was ready to ignore the luxury brands but her Dad insisted she thought deeper, since she would be spending the same or more money but it might not be a head turner.

Tired of all the searching and brain storming, she decided to give herself a break and glanced at her instagram account. Little did she know that it might complicate things further!. One of her team member , who was reporting to her, is posing with her newly acquired priced possession Audi A4(sedan with price range of Rs 23 lakh onwards)!

Then in October 2018, Honda CR-V was re-launched, again excellent features, supposedly 7 seater SUV. The duo felt they were closer to taking a decision and thought since it was a Honda and not the premium segment, they might be able to save some money as well. The price of around Rs 34 lakhs brought them to square one. Model of Honda Cr-V of 2018 vs Audi Q3 of 2015 and so on....

Introduction to Industry

Automobile industry in India was once a pocket sized arena with Hindustan Motor's Ambassador car and Premier Padmini's Fiat being the only two players. In 1981, The Government of India founded, Maruti Udyog Limited which merged with the Japanese automobile company **Suzuki** in October 1982 and had the majority of share in Indian market. By 2014, Hyundai and Honda had taken two and three spot respectively. These were the pride possession of rich but with the increase in disposable income, easy options of finance and advent of social media , the cars became affordable for the upper middle class. The affluent class needed a differentiator and so came in India the luxury car brigade, (Fig 1***, shows the entry of all luxury cars), beginning with Mercedes in 1995. Luxury brands are meant for indulgence, conspicuousness and exclusiveness. The major players that entered India and are still thriving include, Mercedes, Audi and BMW.

In the present scenario, the Indian Luxury car market is expected to register a CAGR of -24% till 2023.* In 2017, Mercedes Benz was the leader with annual sales at 15330 units(highest ever in India) followed by The price heavy luxury cars industry relies greatly on strategic pricing and luring financing schemes (like balloon payments!). The financing schemes, customised for particular models make the instalments, lighter on the pocket in the initial years.

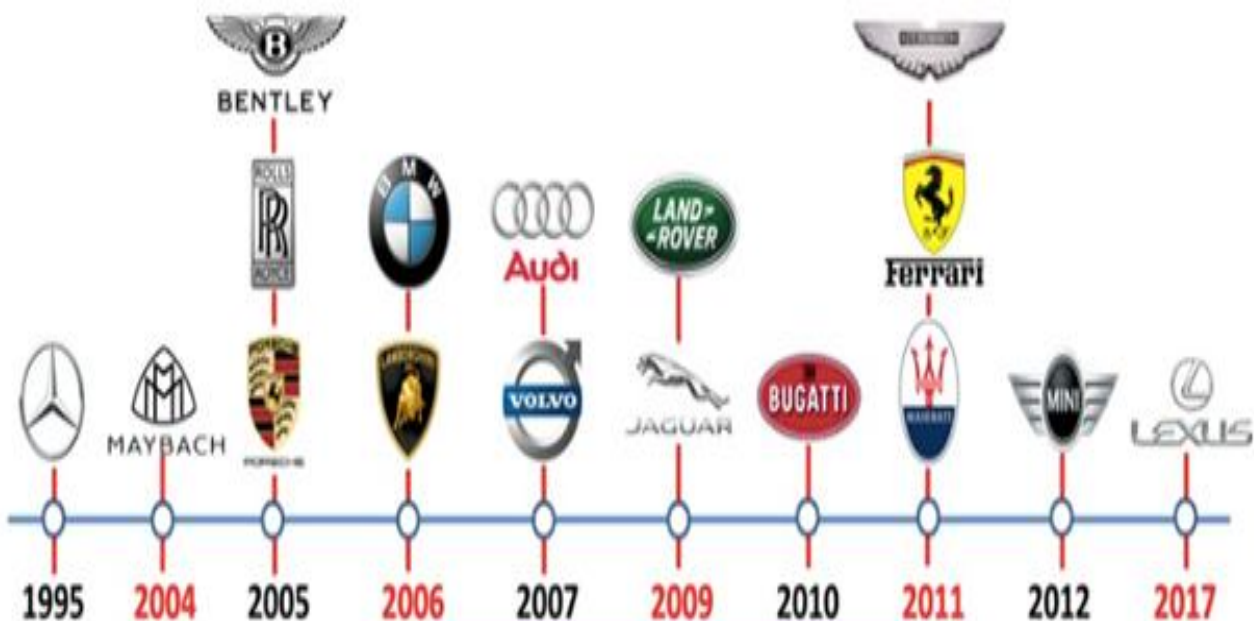


Fig 1: Year-wise Luxury Cars

The luxury segment manifests in SUV and sedan segment, with sedans being growing at 25-30% which is much higher than SUVs growth of -50%.

The Indian market is being trusted, inspite the increase in customs duty and increases taxes in 2018. The GST is at 43% for luxury cars, net taxation has been increased to 50% for SUVs and 48% for Sedans. **The unique growth of middle class customer base is one of the reasons. The differentiator has always been the combination of price bracket and the brand. The increase in the middle class earnings and higher disposable income, a potential is seen in the growth of luxury segment as well, which would increase the penetration of luxury cars in India, which at present is -1%.

Volume	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Mercedes Benz	2,492	3,625	3,247	5881	7,430	6840	9,003	10,201	13,502	13,231	15,330
BMW+MINI	1,387	2,908	3,619	6,246	9,371	9,375	7,327	6,812	6,890	7,861	9,800
Audi	349	1,050	1,658	3,003	5,511	9,003	10,002	10,851	11,192	7,720	7,876
JLR			91	636	1,668	2,410	2,891	2,846	3,200	2,900	3,954
Volvo		90	140	130	325	821	943	1,202	1,423	1,584	2,029
Total	4,228	7,673	8,755	15896	24305	28449	30,166	31,912	36,207	33,296	38,989
YoY Growth Rate		81%	13%	82%	53%	17%	5%	5%	9%	-4%	16%
India GDP Growth (IMF)	9.8%	3.9%	8.5%	10.3%	6.6%	5.5%	6.4%	7.5%	8.0%	7.1%	6.5%
Audi China Sales	94,905	1,05,836	1,46,998	2,04,067	2,57,520	3,28,700	4,11,730	5,13,000	5,09,998	5,36,289	5,49,117
Market Share	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Mercedes Benz	59%	47%	37%	37%	31%	24%	30%	32%	37%	40%	39%
BMW+MINI	33%	38%	41%	39%	39%	33%	24%	21%	19%	24%	25%
Audi	8%	14%	19%	19%	23%	32%	33%	34%	31%	23%	20%
JLR			1%	4%	7%	8%	10%	9%	9%	9%	10%
Volvo		1%	2%	1%	1%	3%	3%	4%	4%	5%	5%
Rank	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Mercedes Benz	1	1	2	2	2	3	2	2	1	1	1
BMW+MINI	2	2	1	1	1	1	3	3	3	2	2
Audi	3	3	3	3	3	2	1	1	2	3	3
JLR			5	4	4	4	4	4	4	4	4
Volvo		4	4	5	5	5	5	5	5	5	5
YoY Growth	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Mercedes Benz		45%	-10%	81%	26%	-8%	26%	13%	32%	-2%	16%
BMW+MINI		110%	24%	73%	50%	0%	-22%	-7%	1%	14%	25%
Audi		201%	58%	81%	84%	63%	11%	8%	3%	-31%	2%
JLR				599%	162%	44%	20%	-2%	12%	-9%	36%
Volvo			56%	-7%	150%	153%	15%	27%	18%	11%	28%

Fig 2: Comparative Chart

The fight amongst the SUVs is toughening. The top competitors in the lower range of SUVs luxury cars are Audi Q3., BMW X1 and Mercedes GLA-Class SUV. Skoda Kodiak is all feature but the front grill lacks the trademarks, customers are willing to pay for. Honda launched CRV in October 2018, with a price tag in competition with the above categories. It is a fully loaded with rich features. So, will the industry thrive with these brands or will the price range take skoda and Honda CRV pitch them with the luxury giants.

Going Forward

Kaashvi was ready to buy her first luxury SUV. She wanted a SUV and weighed all the options. She bounced every detail with her Dad. The two were clear on the price range and considered all the SUVs within the range. The inclination to go for a luxury brand was certainly there. Also, with Kaashvi's her team member buying an Audi, might complicate things a little. Kaashvi was inclined towards Skoda Kodiak and for her even Honda Cr-V might be a good buy but at the same time, she was left wondering if the same is worth the money being spent. The brands vs feature war was not helping the decision making!

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Teaching Note**Case Title : BRANDS VS FEATURES-INDIAN LUXURY CARS**

1. Synopsis of the case : The potential customer in our case, is trying to decide on which Luxury car to buy within the budget that she and her father have decided on. The preferred brands are the same with both the decision making parties(father-daughter), the features remain the differentiator. The case discussion may take into consideration the concept of brand value, pricing, social media /peer pressure and may be touch upon the Gen X and Y debate.

2. Target Group

- BCom(H)/MCom/MBA
(for Marketing)

3. Learning Objectives and key issues

After going with case, students will be able to answer and discuss the following :

- Ques 1: Should Kaashvi be upgrading to a new car? And Why?
- Ques 2: Which SUV should she be buying?
- Ques 3: Since her team member has posted on instagram with her new Audi, should it affect her decision?
- Ques 4: What factors would have made her choice easier?

4. Teaching Strategy

The time plan is as follows for a class of 90 minutes

TTime (in minutes)	Discussion Topic	Key Takeaways
10	Debriefing case by students	How to summarise a case?
10	q1. Should she be upgrading her car.	(reference to consumerism, gen x and Y)
30	q2 Which SUV should she be buying and why?	Evaluation skills understanding of industry and comparative analysis
10	q3 Team member posting on Instagram	social media impact on decisions/ Peer pressure
10	q4 What could make the Choice easier?	Development of acumen (refer to pricing vs features)
10	integration with the model	apply the essence of branding and how relevant it is to luxury cars
10	Concluding	how to close a case?

5. Questions for discussion from objectives

In this case, as in most of the other cases, theres no answer which is right or wrong or a perfect one. The indicative answers are discussed below:

a. Should Kaashvi be upgrading to a new car? And Why?; b. Which SUV should she be buying?

Kaashvi wants an SUV, spacier and better than her present possession Hyndai's Creta. Her father who is her confidant and guide, wants her to upgrade to a luxury segment only. Spending on any other brand, (even with additional features) doesn't have his approval. So the choice is not very easy for them.

- **Opinion 1:** She should not upgrade because no SUV in the luxury brands category matches the requirement of both the father and the daughter. Audi Q3/BMW X1 / Merc GLA are as good as her present car (Creta Automatic) wrt the space and features that she wants, though the brands are not even comparable.

She should wait till she can increase her budget to buy an upper-end real SUV of a luxury brand her father also approves of.

- **Opinion 2:** If she is not bothered about her team members buy is not considered, which she might be, since she's level headed and has a mind of her own. She should upgrade to Skoda Kodiak, since it is the SUV with the space that she wants and the luxury of all the features any car enthusiast can think of. The only flaw is from her father's perspective is the luxury logo missing on the front grill. The other reasonable choice from Kaashvi's perspective seems to be Honda Crv, which is latest and an SUV for sure but doesn't fit in the luxury segment, though the price range is the same. Kaashvi is a bright girl working with a good company that recognises her potential, very soon she may get another hike in the salary and then can move to an upper-end SUV.

c. Since her team member has posted on instagram with her new Audi, should it affect her decision?

One of her team members who has bought an Audi and posted the image on instagram may impact her decision, since now she might feel forced to upgrade, though nothing that matches the requirement of both the decision makers, is available in the market. Her choice of Skoda/Honda doesn't seem to be a logical since the luxury brand is not associated with it.

d. What factors would have made her choice easier?

The following factors need to be discussed

- If her colleague had not bought the Audi, her decision would be simpler and different.
- Lower price of Honda CrV/skoda Kodiak would have made the choice apparent.
- Q3 with better features at the same price would have helped the duo take an informed happy decision.

The options are galore and as many as possible should be discussed.

6. Background reading

It is important to go through the basic concepts of branding, pricing and consumerism from marketing and social media usage impact, in order to understand and discuss the case.

7. Experience of using cases

The case has been pre-tested with around 150 students of BCom(H). Branding is a concept the students were comfortable discussing around the luxury car industry. The students were receptive to the features vs brand ideology being faced by the father-daughter duo. After the initial discussion with 20 students, I had to add some additional pointers in the case so that launch price of Honda CRV is also discussed and posting on instagram to emphasis on luxury car being a status symbol has also been included after the discussions.

A STUDY ON CONSUMER PERCEPTIONS OF PRIVATE LABEL BRAND GROCERIES IN BANGALORE (BENGALURU)

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ABSTRACT

The use of Private label brands in grocery segment in organized retail is a new phenomenon in India. As a result, the understanding of consumer perception of these brands is still at a nascent stage in India. Additionally, the impact of demographics on the perception and the propensity to buy private label brands is even less understood in the Indian context. Of the studies in India, those in Bangalore are even fewer and do not study the impact of demographics on psychographics and attitude towards private label brands. This study is aimed at bridging this gap. The objective of the study is to investigate the influence of demographics such as gender and age, and store visited, on the relationship between perceptions of service, price and quality and attitude towards private label brands purchase. The findings of the study show that store visited has a significant impact on service, price and quality perceptions. Gender does not impact the service, price and quality perception, but age impacts perception about price and quality.

Keywords: Consumer perceptions, private label brands, PLBs, store brands

[1] INTRODUCTION

Indian retail has emerged as one of the most dynamic and fast-paced sectors in the world. Today, India is the world's 5th largest global destination in retail. A large part of this growth can be attributed to rising income, growing aspirations, favorable demographics and easy credit availability (Sabnavis & Kansara, 2017).

Today, retail accounts for over 10% of India's Gross Domestic Product (GDP) and around 8% of the employment. But, a large part of Indian retail is still unorganized and only 9% organized. Of all the retail verticals, the Food and Grocery segment enjoys the larger chunk of the retail market pie and is expected to grow consistently over the next few years. India is the world's 3rd largest grocery market with \$428B worth of sales (Ram, 2017). ibef.org estimates that by 2020, food and grocery segment will account for 66% of total revenue in the retail sector.

[2] Private Label Brands (PLBs): A Growth Driver for Indian Retailers

Discounts or discounting strategy will continue to be a driver of retail in India. One strategy that is seeing an uptick in adoption as a competitive advantage since 2010 is the use of Private Label Brands also called a Retailer Brands or Store Brands. Retailers are also finding that PLBs are a great way to compete against national brands. They are using PLBs as a way to offer discounts and promotions to consumers, which in turn helps increase footfall to the retail outlets. Despite this focus and the opportunity, the PLB strategy is still at a very nascent stage with a share of just 6% ("Retail-November-2017.pdf," 2017).

While private-label success strategies from UK and the US can possibly help propel growth in India, there is still no cookie-cutter approach. Private-label strategies need to be customized and specifically targeted to each geography, especially one as diverse as India. It is known that consumer perceptions influence buying decisions and it is true for private label brands as well. Perceptions change by geography and influence the purchase patterns. Given the diversity of India there are no set perception that can be adopted nationally. Therefore, previous research on PLBs in India has shown varied results in different cities and states. This study provides a characterization of store brand buyers on the basis of their perceptual and demographic characteristics in Bangalore, also known as the Silicon Valley of India.

[3] LITERATURE REVIEW**Definition of Private Label Brands**

Private Label Brands (PLBs) are defined as brands that are owned, controlled, and sold exclusively by a retailer (Baltas, 1997; Raju, Sethuraman & Dhar, 1995). Private labels are also known as store brands, own brands, own labels, distributor-owned brands or retailer's brands (Kumar & Steenkamp, 2007). Roy (2005) defines PLBs as consumer products produced by or for, retailers and sold under the retailers' own brand name or trademark, through owned stores.

Raju et. al. (1995) argue that private labels offer a good price and acceptable quality these days. As a result, consumers are giving less importance to brand names and are willing to use store brands. Retailers are also

becoming more proficient at managing their private labels. The authors also discuss that these factors will result in continued growth of private label brands.

Demographic Characteristics and PLB Proneness

Batra & Sinha (2000) found that the age of the consumer is an important determinant of the attitude towards store brands. Dhar and Hoch (1997) mentioned that private label or store brand market share is impacted by the operating area demographics, as well as retailer's price and promotion tactics among many other factors. Hoch (1996) identified specific demographics to have an impact on private label proneness- the elderly, large families, women who are working and a significant percentage of black and Hispanic consumers in the US were more price sensitive and preferred PLBs. On the other hand, when household incomes were higher, PLBs do not perform well. Contrary to this, Baltas & Argouslidis (2007), found that people with greater income are more store brand prone. Burton et al. (1998) found that less income increases price conscious and thus increases PLB purchase. Starzynski (1993) found that heavy private label users had lower incomes and were largely blue-collar homes. Ailawadi et. al. (2001) argue that demographics play a role in determining shopping behavior. They discuss that women are more likely to be innovative and more store loyal.

One can expect to find different results when approaching consumers from diverse countries. For example, Kuhar and Tič (2008) in their research in Slovenia found that the gender, age and education did not significantly relate to higher frequency of private label purchase. They also found that both small and the large households were more likely to be frequent buyers of PLBs, and not just large families as stated by other researchers. On the contrary, Beneke (2009) in his research on consumers from South Africa found that females and colored consumers were more brand loyal.

In Indian context, De and Singh (2017) in their research conducted in Delhi, Nodia, Ghaziabad and Gurgaon, found that age, gender, occupation, income and qualification had a strong relationship with consumer purchase decision of PLBs. Sandhya, Jayanthi and Mohamed (2011) studied the Chennai market to understand grocery shopping behavior and to determine the effect of consumer perception dimensions and demographics on attitude toward PLB among grocery shoppers. They found that age and gender of the respondents did not influence private label purchase. But, instead family size, income & occupation had a negative influence on the attitude towards private label brands among grocery buyers. Gugloth and Murali (2014) in their research in Bangalore found that price was a crucial decision-making factor for PLB purchase.

[4]PSYCHOGRAPHIC ATTRIBUTES AND PLB PRONENESS

Price

Low price is often one of the characteristics of the PLB and often becomes the predictor of the PLB purchase (Wu, Yeh & Hsiao, 2011). A number of studies have shown that attitudes towards private brands are positively affected by price consciousness (Anselmsson & Johansson, 2007; Burton et al., 1998; Batra & Sinha, 1999). Kirk (1992) found low price to be a very important factor for consumers who choose a store brand over national brands. This meant that PLBs are a good alternative to price conscious consumers. Rao (1969) also discussed that the main PLB customer base in supermarkets was housewives who were price conscious. Bilal & Ali (2013) mention that price has been considered as a main reason for consumers' inclination towards the private brands, and generally price sensitive buyers are more likely to buy private brands.

Singh, Kumar and Sukhwinder (2014) found that Indian consumers buy PLBs for their low price. Gugloth and Murali (2014) in their investigation of consumer preferences for private label brands in Bengaluru (Bangalore) discussed that price was an important factor in PLB purchase decision making. Dhaktod & Chib (2015) discussed that 80% of Indian consumers are considered price conscious. Therefore, these consumers are heavily inclined towards low price while shopping.

Burton et al. (1998) and Chi-Hsun Lee (2008) discussed that consumers who have a positive attitude towards PLBs have extreme price consciousness. Therefore, consumers who have higher price consciousness will mainly use price as the decision-making criteria. Lichtenstein, Ridgway and Netemeyer (1993) found that people who have high price consciousness have a lower belief that high price denotes high quality. Therefore, they are unwilling to pay a high price differential for a product's extra features or advantages (such as brand name, advertisement, packaging, etc.). Therefore, when making purchase decisions, price conscious consumers think the actual benefit brought by the low price is more important than the brand name.

Burger & Schott (1972), and Baltas & Argouslidis (2007) and others have confirmed that private label prone consumers are price conscious. Martinez & Montaner (2008) found that while the price sensitive consumers are more prone to private labels, they are not characterized as budget-constrained. Patel and Barad (2016) in the Indian context found that consumers saw private labels to have quality and still priced lower than national brands.

Batra & Sinha (2000) discuss that the level of price consciousness increases with lower income. On the same lines, Burton et al., (1998), and Chen & Sadeque (2007) discuss that such consumers make purchase decisions based solely on price over other factors. Therefore, it has to be expected that low-price levels of private label brands attract people with limited budget. Burton et al. (1998) found a positive relationship between price consciousness and private label brand attitude for the grocery items.

Quality

Perceived quality is an important factor in private label purchase. Grewal et al. (1998) mentioned that a retailer's reputation and a consumer's product selection within a store are determined by the quality of the merchandise. Given the importance of quality perception, researchers such as Hoch and Banerji (1993) suggest retailers to switch their PLB positioning from price to quality. They argued that perceived quality was much more important than the level of price discount in determining the private-label category share.

Some researchers claim that consumers who prefer quality over price are less likely to purchase private brands because these consumers use price as an indicator of quality. If the price is low, the perceived quality is negatively impacted (Chandrashekar & Grewal, 2006). Dick et. al.'s (1996) research confirmed earlier studies that price is a major indicator of quality.

Bontems et al. (1999) researched on private brands quality and their impact on national brand. Their observation was that if store brands had low quality these could not compete with national brands. But, if the private label quality was high, national brands might face stiff competition.

Service

Service is an important aspect and defines the overall shopping experience. Quality of service is one of the important factors that impacts consumer decisions. Therefore, there can be a connection between service quality and behavioral intention (Brady et al., 2002). Wu, Yeh and Hsio (2011) mention that better service leads to a positive behavioral intention and increases the purchase intention of the consumers and the frequency of going to the store. These authors showed that service quality has a direct and positive effect on the PLB image. Parasuraman et al. (1985, 1988) stated that unlike goods quality that can be measured by durability, service quality is an elusive and indistinct construct. Therefore, measuring the consumers' perceptions of quality is a way to assess the quality of service.

In this research Parasuraman's SERVQUAL scale was used a foundational model. Along with this, concepts and questions from other published worked (Prithivirajh, 2013; Xiao & Chernetskaya, 2010; Bhatt & Bhanawat, 2016; Maria Argollo de Arruda Falcão, De Barros Jerônimo, Melo, Tomaz de Aquino, & Medeiros, 2017) has been used.

Given its substantial use around the world and the depth of dimensions considered, SERVQUAL model was a good resource to consider to build the questionnaire. Khare, Parveen and Rai (2010) in the Indian context used an adapted SERVQUAL model for their study. They surveyed customers of the retail stores that sold grocery and household items. Their investigation revealed that customers rated interactions with the retailers as important. They found that responsiveness and reliability had the highest mean scores. They stated that if the retailer was responsive to customers' needs, understood their product preferences and provided clear answers, then customers had confidence in the quality of the service. These authors also found that the personal interaction with the retailer were important determinants of service quality, as quality is not only about purchasing products, but is also based on interactive experiences.

Tombs and McColl-Kennedy (2003) stated that interactions form an important part of service quality. Ailawadi and Keller (2004) asserted that retailers could create their brand image by attaching unique association to the quality of their service. Kim and Jin (2001) while studying the Korean customer perceptions found that Tangibles (which includes physical facility, appearance of employees and equipment) were most important. In the study by Siu and Cheung (2001) in Hong Kong, Empathy (caring, individual attention), had the greatest impact on the customer evaluation of service quality.

Bhatt and Bhanawat (2016) measured the customer satisfaction based on service quality within hypermarkets Udaipur in Rajasthan state, India. In their research, they state that SERVQUAL model thus far has been utilized across industry sectors, cultural contexts and locations, by both academicians and practitioners.

The scale used here includes reliability, responsiveness, assurance and empathy. The current scale also takes inputs from multiple other studies. All these dimensions were combined into the questionnaire for this research.

[5]RESEARCH METHODOLOGY

Fraser (2009) stated that past studies on private labels and consumer perceptions were largely in the developed world including the US and UK. Little research was undertaken in markets where private labels were just penetrating and were not well established (Anselmsson & Johansson, 2007). In a fast-paced market such as India there are limited studies on PLB in general as the entire store brand phenomenon is relatively new. Additionally, very few studies have been done in understanding the socio-demographic variables' influence on perceptions on PLBs.

[6]OBJECTIVES OF THE STUDY

Understand the socio-demographic profile and store preferences of the customers making PLB purchases at selected organized retail outlets in Bangalore

Identify the relationship between different socio-demographics and perception variables of PLB groceries and intent to buy

[7]HYPOTHESES

H₀₁: There is no significant difference between gender and perception about service at the store and, price and quality of PLB products.

H₀₂: There is no significant difference between age and perception about service at the store and, price and quality of PLB products

H₀₃: There is no significant difference between store visited/ store name and perception about service at that store and, price and quality of PLB products

[8]SAMPLING AND SAMPLE SIZE

The geographical area chosen for the study was Bangalore (Bengaluru) city, in the state of Karnataka. To have a representative sample, initially the geographical areas of Bangalore, as divided by the Bruhat Bengaluru Mahanagara Palike (BBMP), were considered. It was found that there exist eight different zones. Out of these one zone, Mahadevapura, was selected randomly. In this area consumers going to BigBazar, More, Star, M.K.Retail and Reliance Fresh were chosen. A sample of 780 responses was collected from these stores between 12/9/2017 and 12/9/2018. Of these 715 were considered for the analysis. A questionnaire was considered for gathering responses. The questions were multiple choice and only one response was to be selected. The perception attributes were measured on a 5-point Likert-scale. The points on the scale include: Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree.

[9] FINDINGS AND ANALYSIS

The opinion of the respondents to different statements related to private label brands were given scores: -2 for strongly disagree, -1 for disagree, 0 for Neutral, 1 for agree and 2 for strongly agree. Then, for each item-service, price and quality the average of the scores under that item were calculated and termed as Average Score for that item relating to PLB groceries. These average scores were then grouped into three classifications namely <0, -1 and 1 & above.

Following this the Chi-Square table for testing the independence between gender and service at the store they visited was conducted in Table 9.1.

Table-9.1: Distribution of respondents based on Gender and Average score of Service.

Gender		Code of Service			Total
		<0	0-1	1 & Above	
Male		18	236	110	364
Female		18	237	96	351
Total		36	473	206	715

Chi-Square=0.717

df=2

p-value=0.699

Based on the p-value > 0.05, it can be inferred that there is no impact of gender of the respondents on the service received while purchasing the groceries from the store they visit.

The Chi-Square table for testing the independence between gender and price of the groceries was done in Table 9.2.

Table-9.2: Distribution of respondents based on Gender and Average score of Price

Gender	Code of Price			Total
	<0	0-1	1 & Above	
Male	125	170	69	364
Female	101	172	78	351
Total	226	342	147	715

Chi-Square=2.876**df=2****p-value=0.237**

It can be inferred that there is no impact of gender on the price perception of the groceries they are buying at the store they visit. That is the feeling about prices of the groceries is almost the same in both males and females.

The Chi-Square table for testing the independence between gender and quality of the groceries was done in Table 9.3.

Table-9.3: Distribution of respondents based on Gender and Average score of Quality

Gender	Code of Quality			Total
	<0	0-1	1 & Above	
Male	9	178	177	364
Female	6	200	145	351
Total	15	378	322	715

Chi-Square=4.826**df=2****p-value=0.090**

From table 5.6, it can be inferred that there is no impact of gender on the perception of the quality of the groceries the respondents are purchasing. This means that the feeling about the quality of the groceries is almost same in both males and females.

The Chi-Square table for testing the independence between age and service at the store they visited was done in 9.4.

Table-9.4: Distribution of respondents based on Age and Average score of Service

Age	Code of Service			Total
	<0	0-1	1 & Above	
18-25 Yrs	9	89	27	125
25-35 Yrs	12	147	67	226
35-45 Yrs	13	121	65	199
45-60 Yrs	2	87	36	125
60 & Above	0	29	11	40
Total	36	473	206	715

Chi-Square=4.719**df=4****p-value=0.317**

With $p\text{-value} > 0.05$, it can be inferred that there is no impact of age of the respondents on the perception about the service they receive while purchasing the PLB groceries from the store they visited. The Chi-Square table for testing the independence between age and price of the groceries bought was done Table 9.5.

Table-9.5: Distribution of respondents based on Age and Average score of Price

Age	Code of Price			Total
	<0	0-1	1 & Above	
18-25 Yrs	15 (12)	71(56.8)	39(31.2)	125
25-35 Yrs	53(23.5)	112(49.5)	61(27)	226
35-45 Yrs	68(34)	102(51)	29(16)	199
45-60 Yrs	75(60)	35(28)	15(12)	125
60 & Above	15(37.5)	22(55)	3(7.5)	40
Total	226	342	147	715

Chi-Square=88.804**df=8****p-value=0**

With $p\text{-value} < 0.05$ it can be inferred that there is a significant impact of age of the respondents on the perception of price of the PLB groceries purchased from the store the respondent visited. To further understand the trend percentages by row total were calculated and presented. Based on these percentages it can be said that in case of low average score (<0) is highest in the age group of 45-60 years and least score goes to the age group of 18-25 years. The medium score (0-1) is the highest in 18-25 years age group and least in 45-59 years group.

In case of higher score (1 & above) highest is in the age group of 25-35 years and least in the age group of 60 & above.

The Chi-Square table for testing the independence between age and quality of PLB groceries was done in Table 9.6.

Table-9.6: Distribution of respondents based on Age and Average score of Quality

Age	Code of Quality			Total
	<0	0-1	1 & Above	
18-25 Yrs	4(3.2)	78(62.4)	43(34.4)	125
25-35 Yrs	1 (.4)	132(58.4)	93(41.2)	226
35-45 Yrs	10(5)	91(45.7)	98(49.3)	199
45-60 Yrs	0(0)	53(42.4)	72(57.6)	125
60 & Above	0(0)	24(60)	16(40)	40
Total	15	378	322	715

Chi-Square=16.897

df=4

p-value=0.002

From table 9.6, it can be inferred that there is a significant impact of age on the perception of quality of the PLB groceries at the store the respondents shopped at. Based on these percentages it can be inferred that in case of low average score (<0) 35-45 years age group is the highest. The least score goes to the age group of 45 & above. In case of the medium score (0-1) the highest score percentage is in the 18-25 years age group and least in the 45-60 years group. In case of higher score (1 & above) highest percent is in the 45-60 years group and least in the age group of 18-25 years. Older consumers had a positive attitude towards PLB quality.

The Chi-Square table for testing the independence between name of the store and service they are getting at the store was done Table 9.7.

Table-9.7: Distribution of respondents based on the Store Name and Average score of Service

Shop name	Code of Service			Total
	<0	0-1	1 & Above	
Big Bazaar	21(8.3)	152(59.8)	81(31.9)	254
More	8(4.4)	112(61.2)	63(34.4)	183
M.K. Retail	1(1.5)	42(63.6)	23(34.9)	66
Star	0(0)	79(86.8)	12(13.2)	91
Reliance Fresh	6(5)	88(72.7)	27(22.3)	121
Total	36	473	206	715

Chi-Square=18.481

df=4

p-value=0

With p-value <0.05 it can be inferred that there is a significant impact of the store from which the respondents make purchases on the perception of services at that store. Further analysis shows that the perception of service is stronger with M.K.Retail and least with Star. But interestingly, a large majority of respondents are neutral about the service.

The Chi-Square table for testing the independence between the store name and the perceived price of the PLB groceries at that store was done in Table 9.8.

Table-9.8: Distribution of respondents based on Store Name and Average score of Price

Shop name	Code of Price			Total
	<0	0-1	1 & Above	
Big Bazaar	51(20.1)	132(52)	71(27.9)	254
More	61(33.3)	86(47)	36(19.7)	183
MK Retails	16(24.2)	42(63.6)	8(12.2)	66
Star	48(52.8)	36(39.5)	7(7.7)	91
Reliance Fresh	50(41.3)	46(38)	25(20.7)	121
Total	226	342	147	715

Chi-Square=53.023

df=8

p-value=0

From table 9.8, it can be inferred that there is a significant impact of the store name the respondents go to for purchases on the perception of price of the groceries at that store. Further analysis shows that Big Bazaar has the most positive perception about price at 27.9% and Star the least. Once again, the total percent of people who

opted neutral and disagree are more than those who were positive about the price. This indicates that the consumers expectations of price and that offered at the store are not aligned.

The Chi-Square table for testing the independence between the store name and the quality of groceries they buy is presented in Table 9.9.

Table-9.9: Distribution of respondents based on Store Name and Average score of Quality

Shop name	Code of Quality			Total
	<0	0-1	1 & Above	
Big Bazaar	7(2.7)	127(50)	120(47.3)	254
More	6(3.3)	116(63.4)	61(33.3)	183
MK Retails	2(3)	33(50)	31(47)	66
Star	0(00)	34(37.4)	57(62.6)	91
Reliance Fresh	0(0)	68(56.2)	53(43.8)	121
Total	15	378	322	715

Chi-Square=22.189

df=4

p-value=0

It can be inferred that there is a significant impact of store name from which the respondents make the purchase on the perception of quality of the PLB groceries from the shop. A large portion of the population was positive about the quality of PLBs and the store they visited. Respondents were most positive about PLBs offered at Star and least with More's.

FINDINGS AND RECOMMENDATIONS

The consumers visiting the stores are almost equally split between female (49 percent) and male (51 percent). About 60 percent of respondents visiting the organized retail outlets were between 25 and 44 years. About 28.8 percent respondents either agreed or strongly agreed that the service at stores they visit is good. There are very few (5 percent) respondents that indicated that they strongly disagree and disagree with the service at the stores, and the remaining were neutral. This opens a large opportunity open for retailers. By improving the overall service offered at their stores they could increase the overall loyalty and perhaps sales.

About 20.6% of respondents either strongly agree or agree with price statements. Interestingly, 1/3rd of total responses on price perception of the PLB groceries is negative i.e. these respondents either disagree or strongly disagree. When it comes to quality, only 2 percent opted for a strongly disagree and disagree statement. 50 percent of respondents expresses an average score of 0-1, neutral. This means that while quality is a key consideration with consumers buying PLB groceries, they are may not be fully satisfied with or are unsure about the quality.

Respondents' Gender did not impact price consciousness. This finding is aligned with other research such as one by Sathya (2013) in Chennai who also found that there was no significant difference between male and female respondents' price sensitivity. Interestingly, this finding contradicts others such as Rao (1969), Starzynski (1993), Hoch (1996), Beneke (2009), and De and Singh (2017) who looked at the Indian market.

The current research found that age and the store visited influenced the price perception of PLB. It was found that the Age of the respondent had a significant influence on the price perception of the PLB groceries. It was found that the younger audience (18-24 years-old) were more price conscious, meaning if the price of the PLB items were to go higher they may not opt for these items. Older respondents were least price conscious.

Those visiting Big Bazar showed a strong relationship with price perception and therefore more likely to buy PLBs there, and Star consumers showed the weakest relationship with price consciousness and thus proneness to buying PLBs.

This research showed that the Quality perception is dependent on Age and Store Name. Quality perception does not change with Gender. When it comes to the age of the respondents, those between 45 – 60 years had the strongest quality perception towards PLBs of all age groups and may be more prone to PLBs. The quality perception of PLBs is strongest with people visiting Star.

CONCLUSION

Private label brands have made tremendous inroad in the organized retail sector in India in the last couple of decades. While retailers continue to pursue the store brand strategy, the success of private labels has been limited with consumers and only in specific product categories.

This research started with the objective to understand the influence of age, gender and store name on the consumer perception of service, price and quality and its influence on PLB purchase. This research bridges the gap in understanding of consumer perception towards PLB groceries in the Bangalore's organized retail stores.

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EVALUATION OF SOCIAL MARKETING INTERVENTION IN DIARRHEA MANAGEMENT PROGRAM – A REVIEW

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ABSTRACT

Background: The use of social marketing is widely recognized and used as an effective tool to effect or influence the health behavior on the individual level and in solving the public health problems. In India, diarrhea being a leading cause of deaths among children aged less than 5 years and causing 18 per cent of the deaths have become an important public health problem. This accounts to more than 22 percent (one-fifth) of the global Diarrhea related child mortality and the highest number of Diarrhea related deaths in any country across the world.

Objective: This paper is an attempt to review available literature on social marketing and diarrhea management program in context of behavior change and social marketing interventions.

Methodology: The secondary sources of data were obtained from online public access catalogues and database J Store, ProQuest, Google Scholar and PubMed. Review includes research papers, online articles, and student thesis. The paper used as reference focused on the application of social marketing interventions in diarrhea management program. The paper was selected on the occurrence of key words like social marketing, social interventions, diarrhea control, diarrhea management, evaluation, ORS, Zinc, and behavior change communication.

Findings: Conceptual framework was developed considering all factors important for disease control. Study will aid our perceptive and facilitate the program mangers in understanding useful communication tools and designing social marketing strategies for effective behavior change in diarrhea management.

Keywords: Social Marketing, Diarrhea, Behavior Change Communication, Knowledge, Attitude, Practice

INTRODUCTION

When the techniques of commercial marketing are applied to the social problems, aiming to develop a sense of awareness among the target audience, to educate the target audience, to influence their voluntary or involuntary behavior with an aim to improve their behavior for their own benefits, or of the society as a whole, it is known as Social marketing (Donovan et al, 2003).

The use of social marketing is widely recognized and used as an effective tool to effect or influence the health behavior on the individual level and in solving the public health problems. Social marketing has been very instrumental in promoting the health behavior and has given a strong platform to the public health professionals to develop programs aimed at promoting health behaviors (Coreil et al, 2001). Social marketing include all strategies based on wide range of health communication approach which include mass media, interpersonal, other modes of communication, promotion, dissemination, and community level outreach. In order to target the changes in the health risk behavior, social marketing applies various methodologies based on exposure, persuasion and behavioral theories. The social marketing understands its target audiences thoroughly with its particular approach to achieve the desired goals and then sustain them, thereby making it relatively easier for the people to adopt the life enhancing behaviors .This is where the strength of social marketing lies. The success of social marketing is always measured in terms of behavior change of the population (Griffiths Jenny et al, 2008).It has been useful as an effective tool to promote anti-smoking behavior, in reduction of the risk behavior associated with AIDS, increase awareness for utilization of public health services, increase awareness regarding programs like family planning, polio immunization, use of ORS zinc in diarrhea management and many more.

Worldwide, there are nearly 1.5 billion episodes of Diarrhea leading to the demise of approximately 1.5 -2.5 million children per year, aged less than five years , making it the leading cause of pediatric morbidity and mortality (UNICEF/WHO, 2009).

Situation among the developing countries is grimmer due to infection, malnutrition and illiteracy. In India, diarrhea being a leading cause of deaths among children aged less than 5 years and causing 18 per cent of the deaths have become an important public health problem. This accounts to more than 22 percent (one-fifth) of the global Diarrhea related child mortality and the highest number of Diarrhea related deaths in any country across the world. (POUZN Project, 2010). A leading cause of deaths among children aged less than 5 years, Diarrhea has become a threatening challenge for the health planners.

Severe infectious diarrhea in children is largely associated with "poor environmental sanitation and hygiene, , poor accessibility of medical facility inadequate water supplies, wrong cultural beliefs and practices, poverty, malnutrition, dehydration, lack of breastfeeding and illiteracy. Hygiene environments, treatment within six hours, use of ORS and Zinc for diarrhea treatment are some of the factors which can prevent diarrhea.

The national Diarrhea Disease Control Program while its launch has the intention to improve the knowledge, awareness and also to inculcate the practice of the appropriate management of the case among the healthcare providers and the caretakers of the young children (Dua T, et al, 1999). It aimed to reduce the mortality and malnutrition through Oral Rehydration Therapy (ORT) caused due to diarrhea in children, in short term and reduce the morbidity caused due to diarrheal disease by improving the epidemiological surveillance, by improving the excreta disposal, water disposal and by improving the child care practices as a long term objective . With an aim to control and manage diarrhea among children, the Government of India, under National Rural health mission has initiated the provision to add Zinc to the ORS. In order to prevent the childhood diarrheal episodes, the Government of India has also taken other measures like increase in Vitamin A supplement , increasing in awareness for breast feeding among mothers, increasing the sources of clean drinking water, better sanitation facilities and immunization against rotavirus. For communication of the diarrhea management program, the mass media promotions were used as key tool. However, pertaining to the implementation of the program and coverage of the existing cost effective interventions, a lack of knowledge has been observed among the provider along with the low awareness levels. (Shah et al, 2012)

As per the analysis of the NHFS data, the electronic mass media make a notable influence on the awareness level of mothers pertaining to about the ORS packets (56% in exposed, 32% in unexposed) and ORT use rates (38% in exposed, 25% in unexposed) (Dua T. et al, 1999). The success of ORT implementation at the village level is dependent upon an adequate supply of packets containing the glucose-salt mixture, extensive training of doctors and paramedical staff, and a strategy for educating mothers to ensure effective home delivery of ORT.

Thus there is a need to explore further the reasons of lack of awareness related to diarrhea management among care providers. Government and NGO's played major role in organizing and implementing different promotional activity and social marketing interventions with respect to Diarrhea control. But important is to evaluate the social marketing interventions and its effectiveness with respect to diarrhea management program. This paper is an attempt to review the available literature on social marketing and diarrhea management. This will help in understanding interventions activities in context of diarrhea management and framing conceptual framework for in-depth study.

METHODOLOGY

The secondary sources of data were obtained from online public access catalogues and database J Store, Google Scholar, ProQuest and PubMed. Review includes research papers, online articles, and student thesis. The paper used as reference focused on the application of social marketing interventions in diarrhea management program. The paper was selected on the occurrence of key words like social marketing, social interventions, diarrhea control, diarrhea management, evaluation, ORS, Zinc, and behavior change communication.

LITERATURE REVIEW

International studies

Across the world many studies have been carried out related to interventions of social marketing in Diarrhea Management Program. According to one study conducted in Burundi, social marketing campaigns have proved helpful in increasing the use of ORS by increasing awareness among the public about the availability of the product, by making people open for dialogue about the uses of ORS and by increasing the skill set and confidence level for product preparation and administration (Sethson et al, 2011). There are interventions supporting the fact that the promotion of ORS shall be done using a wide range of mass media options available, and by the using various modes to enhance the interpersonal communication. Also its evaluation shall be done carefully with respect to the total Diarrhea treatment products market.

PSI /Cambodia, in their pilot project for promotion and distribution of diarrhea kits (DTK) including ORS and Zinc, distributed the product to a network of village shopkeeper, community health workers and also via commercial retail. The communication campaign used a mobile video unit, interpersonal communication (IPC) and promotional material targeting the caregivers of the children under five, resulting in the increased usage of ORS and improved behavior towards treatment of Diarrhea. The use and recognition of Zinc and ORS was observed higher in the implemented (DTK) villages as compared to the other villages (Borapich D et al, 2010).

With an objective to increase the excess and use of point of- use water disinfection and zinc products as a curative and preventive measure for diarrhea, USAID supported the Point –of- Use Water disinfection and Zinc

treatment (POUZN) in 13 countries. For increasing the access to the treatment and prevention products for the caregivers of under-five children, POUZN put into use a mix of both commercial and social marketing approaches, which included a bunch of cost effective water disinfection products ensuring the availability of clean, pure and safe potable water in the households along with marketing of zinc products assisting the usage of oral rehydration salts. (Stene Angela et al, 2010).

In one of the studies conducted in Bangladesh proved that the education bring a change in the attitude and behaviors among the mothers and simultaneously makes them more open and receptive for the new knowledge and modern medicine (Green EC, 1986). The importance of TV in education on diarrhea was also strengthened by another study. It revealed that the television was far more successful in creating interest among the educated mothers, indicating a strong need of strengthening the education programs using television as a medium to educate mothers and also the healthcare providers (Rao KV et al, 1998).

Apart from Health issues, Social Marketing is also effective in areas like childhood obesity, youth obesity, nutrition and promoting healthy life style. In of the study conducted in European school based intervention, it was observed that using the social marketing could help saving time and money. It leads to the evolution of better strategies which direct the program effectiveness and interventions help in preventing serious public health problems (Martins A et al, 2016).

In one more study conducted in Tanzania on the 'Reach and impact of social marketing and reproductive health communication campaign' reported that exposure to any of the campaign has positive effect on family planning and usage of condom (Meekers D et al, 2003). Reach and frequency evaluation is the part of process evaluation of social marketing which consider evaluation of assessing the leverage of resources, tracking message dissemination, evaluating television and radio distribution, news and consumer affairs coverage, print distribution and documenting community activities (Hersey J, 1999).

STUDIES IN INDIA

In India, Government of India in 1978 laid foundation of the Control of Diarrheal Disease (CDD) program, designated to function under Ministry of Health. CDD program aimed to control the diarrheal disease related mortality among the children aged less than five. Under the Child Survival and Safe Motherhood (CSSM) program, ability of the caregivers to rapidly recognize and manage the Diarrhea was the key agenda of the health education (Ministry of Health and Family Welfare, 2012). To prevent this deadly childhood disease, there has been a substantial investment in public sector in the past 3 decades with a purpose to improve water quality and sanitation facilities across India. Over the years, the accessibility for safe and clean potable water has significantly improved in India, however access to sanitary facilities still remain a challenge in India, especially among the rural areas (Census of India Report, 2001). The treatment of diarrhea ranges broadly across various states in India. It is about 56% in Kerala, 70% in Delhi, 79% in Goa, 41% in Madhya Pradesh, 22% in Bihar and a relatively low of 14% in Uttar Pradesh (UNICEF, Coverage Evaluation Survey, 2009).

To promote the prevention and treatment of diarrhea management, as a social marketing intervention the documentaries highlighting the use of ORS and Childhood diarrhea were regularly shown in cinema theatres and aired on All India Radio during early 1990s. In 2000, ICICI initiated the "WHO ORS Campaign for Diarrhea Management" as a part of USAID funded Program for Advancement of Commercial Technology – Child and Reproductive Health (PART-CRH). In 2006, the program had an expansion to the "Complete Home Diarrhea Management Program" (Vyas, 2008). Commercial Market Strategies a new integrated communications campaign addressing the key restricting factors preventing the effective use of ORS i.e., a lack of awareness among parents and physicians and incorrect use of the product. The Campaign was a result of joint effort of six ORS manufactures of Indian origin with focus on key states comprising almost half of India's population -urban areas of Uttar Pradesh, Bihar, Chhattisgarh, Uttaranchal, Rajasthan, Jharkhand, New Delhi and Madhya Pradesh. They combined mass –media advertising, public relation, community outreach programs, training and development of the providers. The campaign was supported by Delhi Transport Corporation (DTC) and UTI Bank. The campaign was displayed on the DTC buses and at the ATM counters of UTI bank at no cost. Going on the much larger scale, the campaign was also supported by one of the most popular TV serial of Indian television 'Kyunki Saas Bhi Kabhi Bahu Thi'. They integrated the ORS messages of WHO into one of their episodes (SHOPS, Commercial Market Strategies, 2003). Television is one of the effective broadcast channels which have been used effectively to create awareness regarding diarrhea control. NFHS survey presented that the mothers exposed to any kind of mass media had better knowledge of ORS use for diarrhea control less than 5 years of children (Mathew JL et al. 2011).

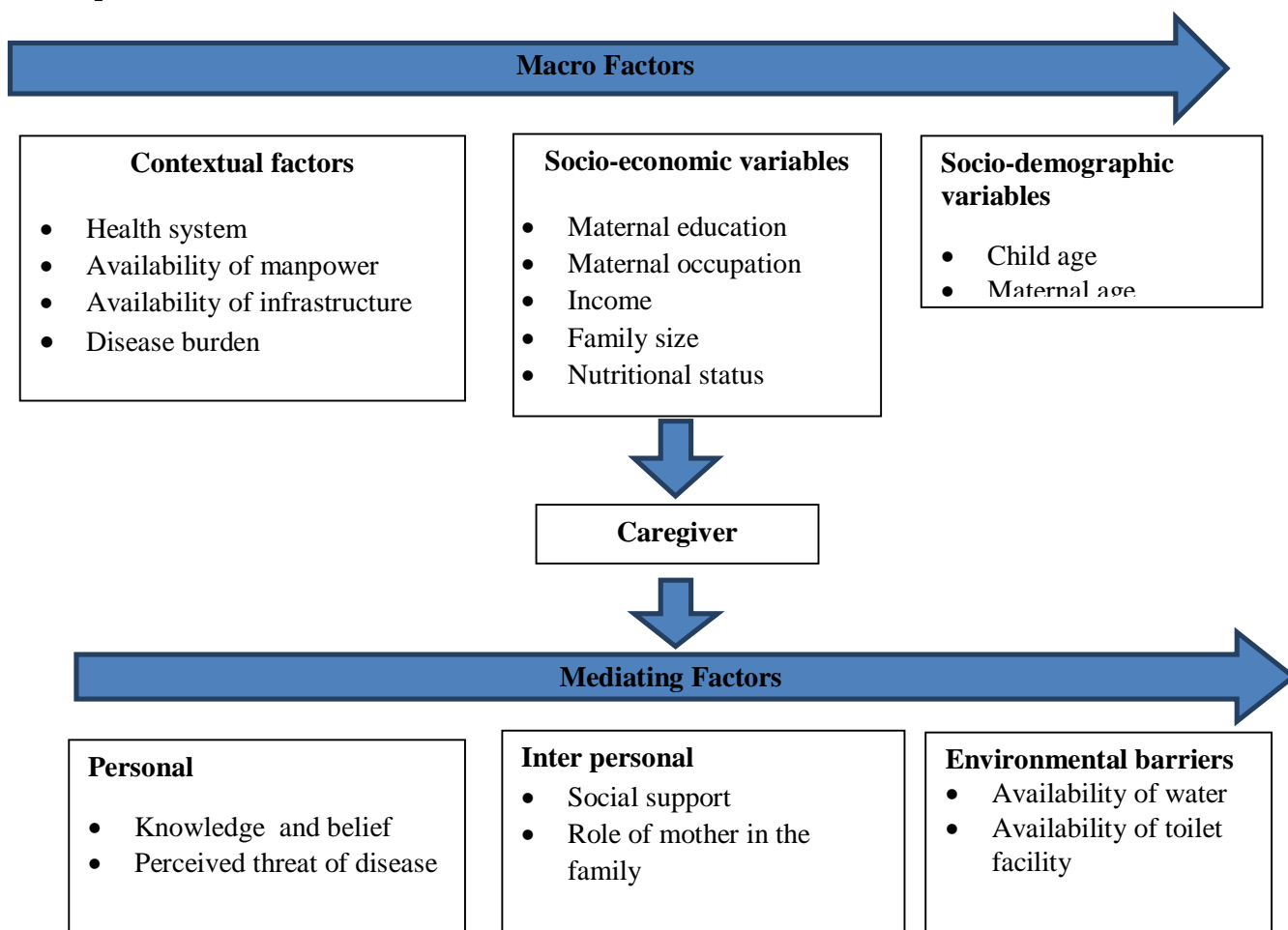
A questionnaire based study was conducted on a small –scale in the Delhi slums to with a purpose to measure the efficacy of a mass media campaign encouraging ORT use during the incidents of diarrheal, launched by the Ministry of Health’s mass media campaign. Sample of 59 mothers was observed, who watched the television advertisement sending out the clear messages by celebrities about the 90 mothers who received the messages of ORT from vivid sources like health workers. As a result, it was found that the first group of mothers, who watched television advertisement, had a better knowledge about preparing the ORS, compared to the group of mothers who received the ORT messages from health workers. (62.7% vs. 37.7%). It also proved that the social marketing of ORS by the medium of TV was more successful in increasing the acceptability, use and knowledge especially among the educated mothers (Koul PB et al, 1991).

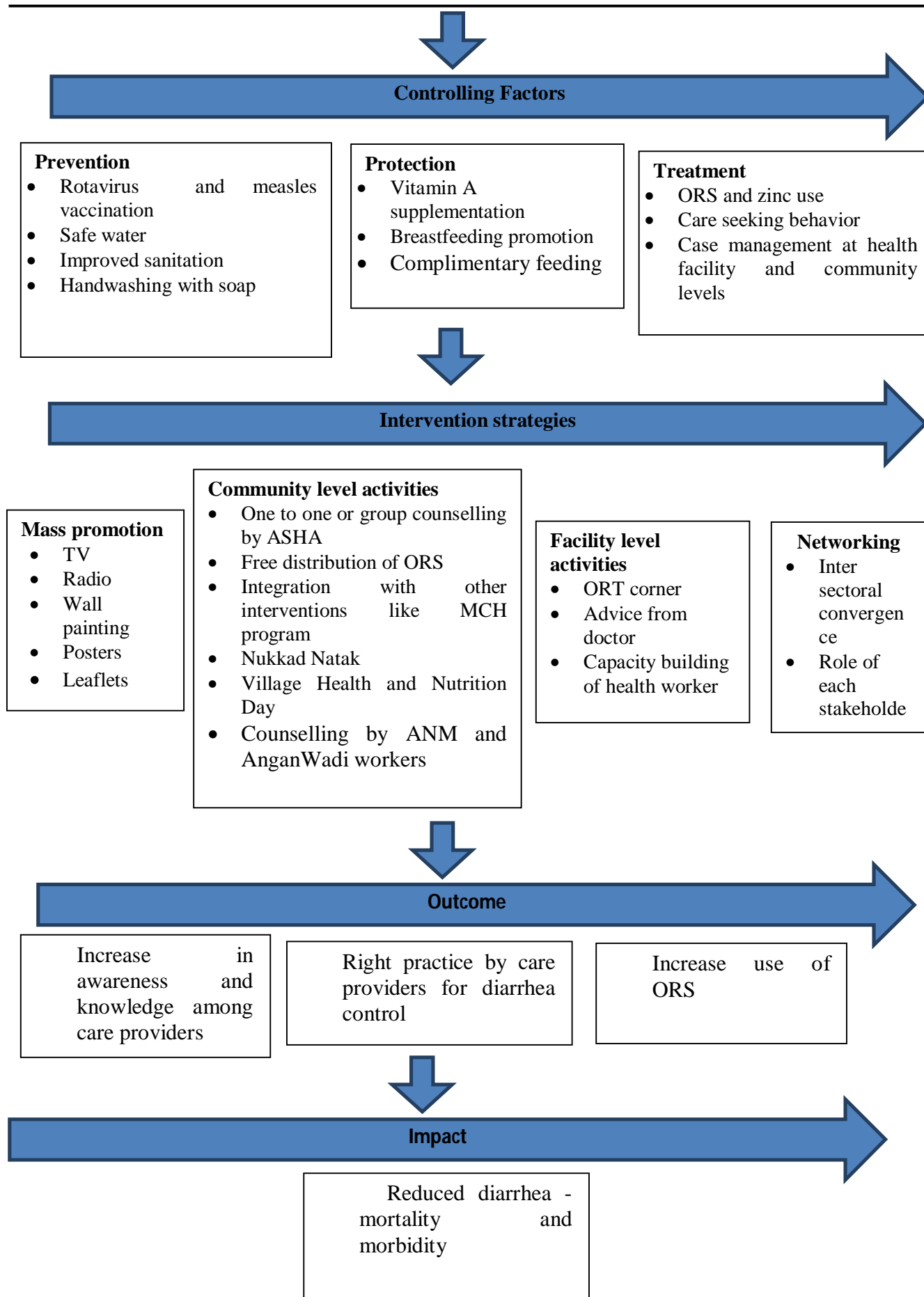
To expand the use of ORS and Zinc, product availability and price also plays an important role which needs to be considered. Point-of-Use Water Disinfection and Zinc Treatment (POUZN) project was created by USAID to carve a demand for zinc ensuring a continuous availability at an affordable price and also increase the usage of ORS. To make it happen, USAID contracted FHI 360 to introduce Zinc with ORT in India for a period of 5 years - 2005-10. The need for quality control in India could be easily accessed by the fact that more than 100 companies in India produce about 130 different commercial ORS products. PSI, HLPPT, Dr Reddy and many more companies participated in diarrheal disease treatment programs. But there is limited study conducted in India which comprises evaluation of social marketing intervention for Diarrhea management program as a whole. Presently social marketing is understood only at promotional and communication level but there are many other P’s of social marketing to investigate and evaluate further for successful implementation of the program related to Diarrhea Management.

DISCUSSION

The literature review illustrates that many controlling factors are responsible for the management of diarrhea cases. It becomes imperative to understand the diarrhea disease management framework in relation with various intervention strategies. Above mentioned studies explained the interventions and controlling factors separately. The mentioned below conceptual framework is an attempt to put all associated factors and related interventions in a complete framework to understand criticality in detail.

Conceptual Framework





Based on the conceptual framework, further work is required to assess behavior change in the target audience with respect to knowledge and practice of Diarrhea Management.

CONCLUSION

This study is helpful in the expansion of knowledge on increasing awareness and adopting behavior change communication methods and strategies related to Diarrhea management, addressing the prevailing problem of India. In a wider sense, it will aid our understanding and facilitate the program managers in choosing useful communication tools and designing social marketing strategies for effective behavior change. It assist to policy managers in the formulation of national and local policies that would go a long way to help address not only Diarrhea control but also improving overall health indicators of India.

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360 DEGREE FEEDBACK AND BEHAVIOUR OF THE EMPLOYEES ASSESSED – A STUDY

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ABSTRACT

Three sixty degree feedback, also known as multi – rater, multi – assessment feedback has emerged as an important strategic tool used by the organizations for evaluation and developmental purpose because of its ability to provide an all round view of employees present and potential performance from various sources simultaneously such as superiors, peers, subordinates, suppliers, customers and vendors. This method has a potential of creating both behavioural change and organisational change. This paper discusses the behavioural change amongst the employees which is induced by the use 360 degree feedback method in an organisation. The behavioural change is discussed with respect to 3 parameters i.e. 1) Communication 2) Teamwork 3) Attitude which are considered important for measuring behavioural change in the employees. The change in behaviour can either be positive or negative that ultimately affects the effectiveness of the organisation.

Keywords: 360 degree feedback, behavioural change, communication, teamwork, attitude

INTRODUCTION

The concept of Human resource management is considered to be associated with the “people” dimension. The importance of the people in the organization cannot be undermined. Every organization is comprised of people; identifying their skills, acquiring their services, developing their skills, motivating them to high levels of performance and ensuring organizational commitment which is imperative to achieve organizational vision and mission. This is true, regardless of the type of organization: government, business, education, health, recreation, or social action. Getting and keeping good people is critical to the success of every organization.

There is always some difference in the quality and quantity of the same work done on the same job by different individuals. It is important for an organization to know the differences between the employees in terms of their performance so that they can be rewarded accordingly. However, many evaluation factors are relatively subjective. For ex., Evaluation of attitude, personality, change in behavior, cooperation is subjective factors. Despite being subjective, they are important factors which must be considered for performance evaluation. Effective performance evaluation not only considers current performance but also the potential performance of an employee. Performance appraisal is imperative to understand each employees capabilities and their relative worth for the organization. Previous research has shown that appraisals are used in organizations for multiple purposes. For potential assessment companies employ variety of methods ranging from annual performance assessment to 360 degree assessment which provides information about an employee from multiple sources on continuous basis.

Appraising the performance of an employee has always been a subject of controversy. Almost everyone is dissatisfied with their performance evaluation. The primary reason for the same being- a single source is being considered for the decision. In today’s scenario where the employees are better educated they have an expectation of being treated differently in the organization. They want their work to speak for themselves rather than “please the boss”. These factors have contributed to the growth and development of a new method of performance evaluation known as the 360 degree feedback method.

RESEARCH OBJECTIVES

This research paper proposes to study the impact of 360 degree feedback method on the behaviour of the employees of the organization. The behavioural change is discussed with respect to 3 parameters i.e. 1) Communication 2) Teamwork 3) Attitude which are considered important for measuring behavioural change in the employees. The change in the behaviour can either be positive or negative depending on several factors like recipients personality traits, goal orientation, self efficacy, locus of control, feedback received, follow up activities after feedback and difference between the real self and the ideal self.

RESEARCH METHODOLOGY

Data has been collected through close ended questionnaires. The questionnaire was circulated among 70 respondents of which 56 were received. Data information of 30 respondents is being considered as 16 questionnaires received had incomplete information. The filter question was “Does your company follows the 360 degree feedback method”. Respondents who answered this question negatively were not considered for study. The data of 30 respondents belonging to the company which follows the 360 degree feedback method

has been considered for the study. Exploratory factor analysis has been used to identify the significance of the various factors being considered to study the variables attitude, communication and teamwork. The responses collected are also analysed using Kendall's coefficient of concordance. Use of secondary sources of data collection has also been made.

MEANING OF 360 DEGREE FEEDBACK

360 degree feedback is a management tool used in organizations where the employee receives feedback on his job performance and behavior outcomes as well as his potential from a circle of raters as opposed to one supervisor. It provides a 360 degree view of employees' performance which cannot be viewed by any other method. It provides constructive feedback that aids in the professional development of an employee. Employees self evaluation completes the circle. The feedback is received from the superior, subordinates, peers, customers, vendors, suppliers and other interested stakeholders with whom the employee interacts in the course of his job performance. For example performance of a salesperson can be evaluated by his supervisor in terms of the ability of the employee to achieve his performance targets. His peers can provide information about his attitude towards his job and the company his general disposition and level of commitment to the job and the company, his interaction with people outside his departments. His subordinates could provide information about his willingness to help them, cooperate with them, if he takes them for a client visit etc. Similarly the customers with whom he deals can provide insight into his willingness to help them, follow up complaints, and go beyond the stated guidelines for help.

REVIEW OF LITERATURE

360 degree feedback can create behaviour change under the right circumstances (Goldsmith and Underhill 2001). Also there are studies indicating that 360 degree feedback process sometimes create no measurable change (Siefert 2003) and, at times, may actually have negative effects (Pfau and Kay 2002). However, any kind of generalization cannot be made since the 360 degree feedback process application varies across companies (3D Group 2002, 2004, 2009). It is suggested that 360 degree feedback brings about positive changes in behavior when used as a development tool in an atmosphere of trust, openness and sharing.(Ghorpade, 2000). David Lobdel in his research project Selecting An Appropriate Performance Appraisal Program For Spokane Valley Department, (1997) recommended that 360 degree Appraisal was the most beneficial for an organization in today's work environment. When used effectively, Hurley (2008) found that 360-degree feedback could increase communication, foster employee development, and increase productivity and efficiency on a team.

Use of 360-degree feedback increases self-awareness as others view the assessment of their performance in comparison to how others assess their performance. A self-awareness of individual strengths and weaknesses leads to improvements in work behavior and performance, which in turn contribute to greater overall team performance (Antonioni, 1996).

Even the process of completing the 360-degree feedback allows raters the opportunity to reflect on their own behavior and determine whether they may need to improve their own performance to better align with expectations (Dominick 1997).

When 360-degree feedback is combined with setting specific performance goals that relate to developmental areas identified in the feedback, even greater changes in behavior are expected (Dominick et. al., 1997).

Asumeng (2013) observed that an employee or manager who actively seeks feedback about his or her job performance is assumed to be more effective in his or her job than one who does not, suggesting feedback-performance link The fact is that many organizations are already successfully using 360 feedbacks as a part of their performance management systems, as well as for other personnel decisions such as staffing, succession planning and high potential selection and development. (Bracken and Church 2013)

Perceived organizational support significantly affects employees' performance. Organizations looking to improve employee performance should take cognizance of this direct link. (Rai and Singh 2013)

Behavioral Impact Of 360 Degree Feedback

A number of factors can enhance or hinder behavioral change. Also there are many individual characteristics which are resistant to change or even impossible to change. This paper proposes to study behavioral change amongst the employees with reference to three variables 1) Communication 2) Teamwork 3) Attitude for their effect in inducing sustainable behaviour change. It is believed if employees' behaviour improves positively, organizational performance improves, subordinates could be expected to be more satisfied with their jobs and less likely to quit. The cost of recruitment, selection, training, development and orientation of a new employee

is relatively higher than retaining the existing employee and motivating them to deliver their best performance for the organization. Organizations invest in 360 degree feedback programme with the expectation that not only will their employees will have a positive behavioural change but will become aware of their strengths and developmental areas which will influence the important organizational outcomes. The key to bringing behavioural change is acceptance – the extent to which the recipient is willing to accept that the feedback is accurate and considering the same to serve as a guide for behavioural change. The process should be designed and implemented in such a way so as to maximise the probability of acceptance. Reinforcing awareness alone is not sufficient. The path between acceptance and sustainable behavioural change is not necessarily a short direct path.

Communication

In reference to studying the role of communication in bringing a behavioural change in the employees of an organization following observations were made:

85% respondents felt that they can now communicate and promote their ideas more persuasively than they could do earlier. While 10% of the respondents disagreed with the statement. None of the respondent disagreed with the statement

69% of the participants to the research assented that use of 360 degree feedback promotes high quality work amongst the employees of the company with there being only 2% disagreement among the respondents to the study

64% respondents to the study agreed that their teams now solicit input from other team members to make informed decision and 24% respondents strongly agreed with the statement thereby almost 88% participants agreed that there has been improved team work in terms of communication. 3% respondents were neutral with the statement.

The contribution of 360 degree feedback in establishing relationships of fairness and integrity was agreed by 58% of the respondents and 40% respondents strongly agreed with the ability of 360 degree method in bringing fairness and integrity in an organization. There was 98% agreement that indeed the use of 360 degree feedback method has promoted fairness and integrity in the organization.

It has been found that adoption of 360 degree feedback has resulted in pro active communication. Also the level of communication between the employees has increased. They now communicate and promote their ideas more persuasively. The use of this technique in companies has led to the promotion of quality work as the employees have now recognised that the work speak for itself. The level of interaction among the team members has significantly increased. Teams now solicit inputs from other team members to make informed decisions. The use of 360 degree feedback contributes in establishing the relationship of fairness and integrity. All these factors combined together have led to the increase in the level of communication amongst teams and the organization.

Teamwork

The role of 360 degree feedback in improving and promoting teamwork is of tremendous importance. Its use has motivated team members to share pertinent information with the other team members (83% agreement), promoting excellent team behaviour(88% agreement), creating a climate that encourages team participation (89% agreement), increasing group cohesiveness to a large extent and creating a willingness amongst the team members to be a good team player(90% agreement).

The positive effect of the 360 degree feedback technique on teamwork can not go unnoticed. With the adoption of this method it has been observed that it motivates team members to share pertinent information with other team members. It has also promoted excellent team behaviour. It has created a climate that encourages team participation. Also the level of group cohesiveness has increased. It has also created a willingness to be a good team player. All these factors combined together it is concluded that use of this technique has contributed to the cohesiveness of the teamwork. Also in today's scenario individual work has been replaced by group projects, team based organizations have emerged. All this required of techniques which could promote excellent team behaviour. Certainly the emergence of 360 degree feedback technique has filled the void.

Attitude

While studying the impact of 360 degree feedback in bringing a behavioural change amongst the employees in reference to attitude it was observed that it helps in building open relationships in an organization while encouraging employees to demonstrate empathy for the impact of change on people and processes. It also motivated employees to project "can go attitude" when interfacing with peers, superiors, subordinates and

customers (especially during difficult and challenging situations). It also made them more receptive towards working out problems and challenges.

Attitude of an employee towards the job and the organization plays a critical role in the success and failure of the firm even though indirectly. With the use of 360 degree feedback method there has been noticed a positive change in the attitude of the employees. They are now more receptive towards working out problems and solutions.. Employees now try to build open relationships in an organization. They now demonstrate empathy for the impact of change on people and processes. With the advent of this method, employees now project “can go attitude” when interfacing with peers, superiors, subordinates and customers (especially during difficult and challenging situations”. All these factors combined together it is concluded that adoption of 360 degree feedback has brought a change in the attitudes of employees not only towards the job but also towards their peers, subordinates, customers, clients, vendors but also towards the organization as a whole. The adoption of this method has indeed brought a behavioural change in the employees of the organization.

A five point Likert scale containing 14 statements is created to discover the significant factors that affect 360 degree feedback review. The responses obtained from the respondents were tabulated through Factor Analysis through SPSS.

The reliability of the scale was validated through Cronbach Alpha method and the obtained value is 0.766 which means that the data is not biased and further analysis can be performed without any error. Furthermore, Kaiser Meyer Olkin (KMO) test was performed to calculate the accurateness of the provided sample and the result is .781. In order to extort the Factor loadings Varimax rotation technique was employed.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.781
Approx. Chi-Square		3416.72
Bartlett's Test of Sphericity	Df	91
	Sig.	.000

As shown in the table below, the variables that signify person-trait are removed and the variables which are remaining are spinned through Varimax. Moreover, 3 factors are yielded with Eigen values of 1.0 or higher. Thus, the total variance over 68.35% is explained by the 3 stated components.

Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	5.177	36.976	36.976
2	3.226	23.042	60.018
3	1.167	8.336	68.355
4	.932	6.660	75.015
5	.749	5.348	80.363
6	.518	3.697	84.060
7	.448	3.201	87.261
8	.402	2.872	90.134
9	.357	2.552	92.686
10	.276	1.971	94.657
11	.270	1.925	96.582
12	.235	1.677	98.259
13	.128	.916	99.175
14	.115	.825	100.000

Extraction Method: Principal Component Analysis.

Results of the Factor Analysis are shown below for all the attributes which are affecting 360degree feedback review.

Factor Analysis Results of different attributes of Behavioral change

Factor Label	Loading	Statements
F1 (Team Work)	0.866	(Q6) The use of 360degree feedback [Motivates team members to share pertinent information with the other team members.
	0.848	(Q9) use of 360degree feedback [Has increased group cohesiveness to a large extent.
	0.823	(Q10) use of 360degree feedback [creates a willingness to be a good team player.

	0.759	(Q7) The use of 360degree feedback [Promotes excellent team behaviour.
	0.634	(Q8) use of 360degree feedback [Creates a climate that encourages team participation.
F2 (Communication)	0.807	(Q5) The use of 360degree feedback contributes in establishing relationships of fairness and integrity.
	0.751	(Q3) 360degree feedback promotes high quality work.
	0.746	(Q2) Employees now communicate and promote ideas persuasively.
	0.722	(Q4) Teams now solicit inputs from other team members to make informed decisions.
	0.662	(Q1) use of 360degree feedback has resulted in pro-active communication.
F3 (Attitude)	0.867	(Q14) Is receptive towards working out problems and challenges.
	0.862	(Q11) 360degree feedback method [Helps to build open relationships in an organisation.
	0.773	(Q12) Encourages you to demonstrate empathy for the impact of change on people and processes.
	0.767	(Q13) Motivates you to project a "can go attitude" when interfacing with peers, superiors, subordinates and customers (especially during difficult and challenging situations).

According to the above table the most significant factor is the factor F1. In this factor, employees focus more on team work because team work motivates employees to share information with the other team members. Team work also increases group cohesiveness to a large extent which eventually helps in creating significantly positive atmosphere to encourage team participation. Second most relevant factor is F2 factor (Communication), in this factor because of 360degree feedback employees are now able to communicate and promote their ideas persuasively. In communication 360degree feedback review has also encouraged employees for proactive communication. The least significant factor is F3 factor (Attribute); 360degree feedback review is able to help employees in building open relationships within an organisation.

Using Kendall's coefficient of concordance on the three factors i.e. 1) Communication 2) Teamwork 3) Attitude. Its value ($W = 0.70$) indicating a strong positive correlation amongst these factors in relation to 360 degree feedback method indicating that this method indeed plays an important role in bringing a behavioural change amongst the employees and it has a strong growth potential in the future where the role of human resource as an asset has been constantly increasing at a fast pace.

CONCLUSION

Clearly 360 degree feedback has emerged as a powerful tool in bringing about a behavioral change amongst the employees in an organization. The benefits of the programme will be realized only when it receives support and commitment from the top management complimented with the right organizational climate with an expectation for success. However, it can initially be used as a means of self development, enabling the leaders to identify their developmental areas. The success of the programme depends on the implementation of the process, acceptance of the feedback and accountability for the same. Organizations considering restructuring or downsizing are not in a good position to implement 360 degree feedback because they will have difficulty in garnering the trust of the participants. Additionally, organizational cynicism can also interfere with the success of the process. This process needs to be integrated with the other HR practices of the organization to reap its full advantage. Also assistance needs to be provided to the recipient in understanding and interpreting the feedback. The companies can avail the services of HR professional and the task of receiving and gaining feedback is of supreme importance. Individuals who conduct feedback sessions should be sensitive to individual differences. This method has potential of bringing a positive behavioral change in the employees of an organization.

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A STUDY ON AUDIENCE PROFILING OF SHOW ROOMING CUSTOMERS

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ABSTRACT

The problem of increasing number of Customers using the physical store for the evaluation of product and later on ending up buying it online. The companies have started to report such behavior in increasing manner. It has therefore become necessary for the companies to identify the kind of segment that is involved in doing this activity. The paper has tried to address this issue by the way of cluster analysis to find whether the demographics of the cluster favoring the certain activity is common or not. The paper has also analysed that cluster comparison of the two formats. The cluster favoring showrooming activity is in favor of which format of shopping. During the research it was discovered that on a data sample of 207 of students 52 which amounted to quarter of the sample fell in to the cluster of psychographics that showed the traits of a showrooming active shopper.

Keywords: Showrooming, Cluster Analysis, Cross Shopping Behavior, Brick and Mortar, Audience Profiling

INTRODUCTION

Showrooming refers to the practice of examining merchandise in a brick-and-mortar store or other offline setting, and then eventually buying it online, sometimes even at a lower price. Online stores offer lower prices than the brick and mortar counterparts as they don't have same overhead costs. In other words, the act of visiting stores to examine and try a product before buying it is known as Showrooming (Zimmerman, A, 2011).

Prior to the internet was such a big deal, consumers used to visit various retail stores all by themselves to walk around first, window shop and then deciding what to buy all in the same outing. There were limited options they had for products at the local retail storefronts they visited. Ironically, an employee would had to call another store to see if the product was made available in another location (Zimmerman, A, 2011).

A) Changes in Retail Showrooming

Now, consumers can not only search to see where a product is available, but also can find multiple different retailers online on their mobile device which sells the same product and qualities, usually at lower prices, and all these can happen within a fraction of seconds through their mobile phones.

This is especially true if the product being large like mattresses or kitchen table or rather cost expensive like a branded watch or sunglasses. In these cases, consumers get to know what they're getting exactly before they are to buy it. Thus, they partake in showrooming to feel comfortable on the purchase they're about to make, albeit at a lower price (Rapp et al, 2015).

B) Mobile influence in Retail Showrooming

If one runs a brick-and-mortar retail store and one thinks mobile is one's friend, then one should think again. Some of the impacts of customer showrooming via mobile devices are

- Having quick access to other retailers who can offering the same product at a discounted price
- If the store doesn't provide much information as other online retailers, the customers may think that the product is somehow subpar
- If other store makes the product easier to buy online, that's what the customer will likely do to buy from them Some of other impacts of showrooming
- Showing the customer up front that one has the lowest price
- Giving the opportunity to the retailers to engage the customer in an informed conversation if the sellers notice they are thus searching competitors' sites, hopefully resulting into a sale
- Creating a positive outline experience for the customers while they're showrooming for they don't want to go to any rival

Mobile thus acts like a frenemy i.e both as friend and enemy. It could thus work for or against and that's going (Zimmerman, A. 2012).

C) Showrooming and Consumer Demand

Consumers' demands for cross and omni-channel marketing are sequentially increasing. Not only this situation is opening doors to endless possibilities for businesses and consumers, but also it's giving multiple competing retailers the opportunity to reach varied customers.

According to a SecureNet study, over 50% of the Americans use their mobile devices to search a product online while they are in store. That number has increased to 68% among the 18 to 29 years old demographics, and increased again to 72% for the 30 to 44 years old group (Rapp et al, 2015).

D) App Creation for Easier Showrooming

One way that online shopper are making the most of today's mobile showrooming trend is by creating apps to make showrooming from an electronic device easier. For example, a leading online retail company has launched a price-checking app which offers 5% off on any item that is scanned if the item gets to exist on their site. Price-check mobile applications are making the showrooming process easier and faster.

Many retailers have created apps which enable users in comparing and contrasting various products contained within the stores. This helps consumers make informed decisions while keeping them engaged in their specific store, thus decreasing the odds that they'll choose for doing their business (Mehra Et Al, 2013).

E) Electronic and Appliance-Based Showrooming

Electronic appliances (FMCD) are among the most show roomed categories. Over 60% of consumers who are shopping for these types of products have been using smart phones on regular basis. They tend to understand technology more than average person, allowing them to fully search their options. For this reason, showrooming is very popular. Electronics and appliances also are of high-cost, thus leading to consumers looking for cheaper options.

Best Buy slogan had been declining in its brick-and-mortar sales and it blames the issue on showrooming. Therefore, in order to combat the showrooming customers, Best Buy offers shoppers the lowest price for products irrespective of what they are shopping online or in-store (Quint Et al, 2016).

F) Showrooming and Product Price

Online price-matching is certainly part of buying process. Many retailers in the United States match their price with main online competitors. However, not all major retailers will match to every online retailer. Over 50% of the adults in the United States owned a mobile device like Smartphone or tablet. Online and in-store sales were not connected and uneven. Consumers began to test out to order the same or perhaps similar products from online retailers and now it has only become a new way for shopping.

Technology – specifically mobile and digital marketing has been responsible for changing the retail game and consumers are getting more accustomed to these changes, expecting retailers to also keep up pace with these lines and provide them with smooth shopping experiences. Showrooming is a direct result for these advancement in technology and changes in consumer behaviour. The growing showrooming trend is putting forward a change in a way the retail industry has been functioning and how it will operate in both the near and offshore far future (Rapp et al, 2015).

The increasing product commoditization and price transparency by online retail channels have left many brick and mortar bearing the costs associated on being used as physical showrooms without reaping the rewards of the final sale. As customers continue taking advantage of retail stores to gather data and turn to competing channels for purchasing (Zaubitzer, 2013). The role of the retail salesperson has now shifted and retailers have now been left without clear understanding of how to manage this change in the retailing landscape spree. In this research, we have first defined "showrooming" and investigate individual i.e. salesperson and the level of experiential consequences of perceived showrooming (Mehra Et Al, 2017). After researching the paper published we found negative relationships between perceived showrooming and salesperson self-efficacy and salesperson performance, which are positively moderated by salesperson coping strategies and cross-selling strategies. It was suggested that the negative effects of showrooming can be configured though specific salesperson behaviours and strategies. Further, it was explored that at the store level reaffirm a negative relationship between perceived showrooming behaviors and performance. Finally, in this study we tried to ascertain the audience profile of the respondents who are actively involved in showrooming activity.

LITERATURE REVIEW

The budding phase of retail formats resulting in cross-format shopping has been a subject of research in the economies of developed as well as developing nation (Carpenter and Moore, 2006; Miller, Reardon and McCorkle, 1999). The cross shopping is very common in developed economies (Skallered, Kornelliusen and

Olsen, 2009) and it has been observed that even though the major portion of such economy's retail market is in the hands of organized sector, but even then the inter cross-shopping has been found higher than intra (Bustos and Gonzalez, 2008). Similarly the structure of Indian retail is changing and causing high level of competition among the organized and traditional stores in price and non-price tactics (Srivastava, 2008). This competition from the new formats of retailing has caused the consumer to visit multiple formats to evaluate the value for money factor (Neilson, 2011). The value for money in any emerging and developing market plays the role of ace. This factor influence decision making in store choice. Benefaction of the new store formats has been based on the perceived utility that a shopper will derive from it (Solgaard and Hansen, 2003; Zeithaml, 1988; Sweeney and Soutar, 2001). But does this factor play the most important role in cross shopping also. Since there is only one study that supports the argument in the area by Jayasankaraprasad, 2014 it can be hypothesized that the value for money will play an important role in this study as well.

The term 'value' has been defined by many researchers in different context like Sirohi and colleagues, 1998 defined it as the implicit trade-off between money and goods. But in many studies by other researchers like Bolton and Drew, 1991; Grewal et al, 2003; Volle, 2001 has stressed on other components also fall under the same value category like service quality, quality of store merchandise and price promotion by the store. Consumer switching works like cherry picking in the field, the juicier one gets picked first regardless of what part of field it is in. Therefore retailers are constantly engaged in offering variety of promotion in order to keep it fresh and engaging the customer more (Fox and Hosh, 2005; Nielson, 2008). Offering a variety of fresh promotion is done in order to make the store offers more relevant to the shopping motives of the buyers. Consumer's heterogeneous behavior in developing a store patronage preference can only be well understood if we understand the shopping behavior (Dholkia, 1999; Jin and kim, 2003).

RESEARCH METHODOLOGY

The study was aimed to find out the audience profile of the respondent. The purpose solely was to find out that, if it is at all possible to segment the showrooming active people on the basis of demographics. Since it was meant only for the students of higher education one demographic was certain and that is occupation.

A) Sampling

The study was conducted in semi-urban city of Kurukshetra and since the city had two universities the data was gathered from both the universities. The data collection was done mostly from the Postgraduates and that too the one who were pursuing their masters in business and commerce. The sample size for the study was 207 respondents. The data collection was done by judgmental sampling technique. Due to shortage of resources and time the data collection was done in a non- probability sampling method. The other reason for the same was the adoption of modified scale. The scale that has been used to determine was (Zaubitzer, 2013).

Demographic profile of the respondents

<u>Annual Income</u>	<u>Frequen cy</u>	<u>Gender</u>	<u>Frequen cy</u>	<u>Residing</u>	<u>Frequen cy</u>
Below 3Lakh	58	Male	97	Rural	81
3 – 5Lakh	57	Female	110	Urban	59
5 – 7.5Lakh	42			Semi-Urban	67
Above 7.5 L	50				

Table-1.1

B) Measures and Methodology

The data collection tool was a questionnaire. The questionnaire had three parts. Part A was the demographic profile of the respondents. Part B was psychographic analysis for the determination of shopping behavior and pattern and then part C was a comparative analysis of many variables for online and offline shopping platform.

This study the major focus was first on part B which was analysed with Cluster analysis. The data collected was analysed with help of Kmeans clusters. In this technique after application hierarchal cluster technique and studying the dendogram, it was observed that there are basic 4 major formations that are arriving our of it and showing 4 different patterns of behavioral out come. Then K-means cluster was applied in which an ANOVA table was also requested for studying the variation in statement on the basis of clusters and the number of clusters as studies via dendogram was given 4.

It was then observed after studying the ANOVA table in cluster analysis that out of 15 statements two statements did not show much difference in the opinion and these two statements were removed and the test was applied again. (As shown in Table 1.2)

Number of Cases in each Cluster

Cluster	1	72
	2	32
	3	52
	4	51
Valid		207
Missing		0

Table-1.2

	Cluster		F	Sig.	
	Mean Square	df			
I get an extra energy go out on weekends for shopping	35.36	3	24.058		0
I Don't like when someone else shops for me	5.938	3	3.445		0.018
For me it is important to get the best price for the product	12.618	3	7.119		0
I can visit the store with no intention of buying	27.543	3	16.882		0
I don't have problem in walking out of store	22.464	3	14.567		0
I compare prices of product in different store	0.401	3	0.213		0.888
I should only get advice if I want to buy the product	4.568	3	2.553		0.057
Sellers time is wasted by the customers who don't buy	5.57	3	2.922		0.035
I find it immoral to consult seller and then not buy	12.719	3	8.031		0
I collect product information in many stores before buying	25.932	3	15.569		0
If the seller spent time with customer, the sale chances are definite	35.855	3	25.454		0
I like physical store as it gives me real feel of shopping	29.53	3	20.449		0
For apparels physical store is any day my choice	42.101	3	28.781		0
I am an expert when it comes to internet	4.737	3	2.715		0.046
I can spend hours in a day online	27.72	3	18.962		0

Table-2.1

RESULTS

Then after the removal of the two statements the Cluster analysis was applied again.

Number of Cases in each Cluster		
Cluster	1	72
	2	32
	3	52
	4	51
Valid		207
Missing		0

	Cluster		F	Sig.
	Mean Square	df		
I get an extra energy go out on weekends for shopping	23.658	3	14.402	0
I Don't like when someone else shops for me	11.952	3	7.311	0
For me it is important to get the best price for the product	13.379	3	7.596	0
I can visit the store with no intention of buying	33.005	3	21.282	0
I don't have problem in walking out of store without buying	32.088	3	22.922	0
Sellers time is wasted by the customers who don't buy	21.199	3	12.654	0
I find it immoral to to consult seller and then not buy	13.645	3	8.69	0
I collect product information in many stores before buying	22.025	3	12.78	0
If the seller spent time with customer, the sale chances are definite	23.82	3	15.014	0
I like physical store as it gives me real feel of shopping	34.959	3	25.633	0
For apparels physical store is any day my choice	17.42	3	9.532	0
I am an expert when it comes to internet	7.521	3	4.414	0.005
I can spend hours in a day online	14.031	3	8.431	0

Table-2.2

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

The above Final Cluster shows that the Cluster no 3 with 52 respondents showed the pattern of falling towards showrooming phenomena. It can be seen that it was far more than the other three clusters. The only statement in which the rating is a bit low is the one in which the statement is asking the respondents to rate in favor of the brick and mortar store. In the next step the frequencies of the three demographic variable for the clustered was tested to see whether the audience profiling can be done or not.

Final Cluster Centers				
	Cluster			
	1	2	3	4
I get an extra energy go out on weekends for shopping	3.46	2.34	3.75	2.45
I Don't like when someone else shops for me	2.61	3.44	3.62	3.29
For me it is important to get the best price for the product	2.81	2.28	3.56	3.31
I can visit the store with no intention of buying	3.29	2.38	3.92	2.16
I don't have problem in walking out of store without buying	3.18	4.16	3.79	2.22
Sellers time is wasted by the customers who don't buy	2.94	3.97	3.12	2.2
I find it immoral to consult seller and then not buy	3.38	2.13	3.46	2.59
I collect product information in many stores before buying	2.64	3.91	3.9	3
If the seller spent time with customer, the sale chances are definite	3.63	3	3.21	2.1
I like physical store as it gives me real feel of shopping	3.24	2.53	4.25	2.39
For apparels physical store is any day my choice	3.68	3.13	2.96	2.37
I am an expert when it comes to internet	3.17	3.63	3.98	2.59
I can spend hours in a day online	2.43	2.63	3.48	3.25

The results after the cluster analysis for the 52 respondents demographic profile were as follows

Annual Income	Frequency	Gender	Frequency	Residing	Frequency
Below 3Lakh	18	Male	22	Rural	21
3 – 5Lakh	11	Female	30	Urban	12
5 – 7.5Lakh	12			Semi-Urban	19
Above 7.5 L	11				

The results came out to be inconclusive and the profile on the basis of cluster can't be created. The cluster however shows the positive outcome on the psychographics related to shopping behavior and pattern. Therefore it can be concluded that there is a segment of people who are actively participating in Showrooming activities it is just that these can't be segmented on the basis of demographics. No fix kind of demographic is actively involved therefore the behavioral traits are indicator rather than demographics.

CONCLUSION AND DISCUSSION

The retailers must maintain the store factors rather than relying on a demographic pattern based on gender or class of an Customer to know whether the customer is in store with the intention of buying or just window shopping. The results of the study clearly indicates that the demographics are not going to become a sign towards helping the retail counter in knowing the intentions of a buyer. Mobile phone as a technology is proving itself to be equally damaging for a retailer as much it is empowering his business. The customer is now empowered with the ability to cross-check the pricing of a product standing the store while looking a product for availability at a lesser price.

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PERFORMANCE ANALYSIS OF ENERGY EFFICIENT HETEROGENEOUS CLUSTERING BASED ROUTING PROTOCOLS FOR WIRELESS SENSOR NETWORKS USING NS2

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ABSTRACT

Nowadays, wireless sensor network are deployed sensor nodes to identification an occasion and transmit the data to the base station (BS). Clustering is a method use to minimize the energy utilization of such network. In this paper, we introduced Energy efficient heterogeneous clustering based routing (EEHCR) protocol is based upon the quality of services parameters (QoS). The comparative analysis of EEHCR with low energy adaptive clustering hierarchy protocol (LEACH) and Threshold stable election protocol (T-SEP) on the basis of QoS parameters like as end- to- end delay, packetloss and throughput.

Keywords: WSN, LEACH, T-SEP, EEHCR, CH, BS

INTRODUCTION

A mix of sensor nodes in a helpful way is known as a wireless sensor network. In the wireless sensor network, no. of sensors are sent to the distinctive areas. These sensor nodes are work in the distinctive modes. Wireless sensor networks are utilized in the distinctive applications like computerization, natural, territory observing and air contamination checking [5] [13]. Sensor node detects the information and transmits it to the client. The few parts are utilized in remote sensor arranged to resemble as sensor sensor, processor and base station (BS). Generally, sensors nodes are a fundamental segment of remote sensor arrange (WSN). These are light weight, little in size and compact. Sensor nodes are utilized to send the information from the base station. Another part base station is utilized to gather the information from various sensor sensors. Another approach like direct correspondence is utilized to transmit the information from sensor sensors to base station (BS) yet in the base transmission vitality sensors are closest the base station (BS) has more likelihood to send information than sensor sensors which are situated far from the base station (BS) [10]. Along A mix of sensor nodes in a helpful way is known as a wireless sensor network. In the wireless sensor network, no. of sensors are sent to the distinctive areas. These sensor nodes are work in the distinctive modes. Wireless sensor networks are utilized in the distinctive applications like computerization, natural, territory observing and air contamination checking [5] [13]. Sensor node detects the information and transmits it to the client. The few parts are utilized in remote sensor arranged to resemble as sensor sensor, processor and base station (BS). Generally, sensors nodes are a fundamental segment of remote sensor arrange (WSN). These are light weight, little in size and compact. Sensor nodes are utilized to send the information from the base station. Another part base station is utilized to gather the information from various sensor sensors. Another approach like direct correspondence is utilized to transmit the information from sensor sensors to base station (BS) yet in the base transmission vitality sensors are closest the base station (BS) has more likelihood to send information than sensor sensors which are situated far from the base station (BS) [10]. Along e vitality utilization and increment the system lifetime of the system [1] [5]. The various protocols are given below;

1. Low Energy Adaptive Clustering Hierarchy (LEACH) Protocol

LEACH (low energy adaptive clustering hierarchy) protocol is an example of homogeneous protocol. Basically it is called as a proactive routing protocol [11]. The most imperative capacity of LEACH protocol is the game plan of sensor sensors on caused flag force. In this protocol, sensor nodes are partitioned into various locales based on sensors area. The base station is arranged out of detecting region and a unique node is known as a door node and this sensor is put on focus position [10]. Some sensor sensors are found closest to the base station. Along these lines, the information exchanged from sensor sensors to the base station utilizing the immediate correspondence system and rest nodes are participate in the cluster head (CH) arrangement i.e. clustering strategy [14]. Here a sensor sensor turns into a CH by self-assertively picking a number somewhere in the range of 1 and 0. The cluster head (CH) that distant from the sink expended more vitality for single bounce steering to the base station. However, it has a few restrictions as it performs ineffectively when WSNs are conveyed over a gigantic locale [11].

2. Threshold Stable Election Protocol (T-SEP)

To the change of LEACH protocol for a homogeneous system of WSNs another protocol T-SEP was recommended that suitable asset heterogeneity for the better solidness time of the system. Threshold Stable election protocol (T-SEP) is the heterogeneous sort of system [2]. In this protocol, utilized two kinds of sensor

nodes like as would be normal node and advanced node. The advanced nodes are approved higher weights when contrasted with ordinary node and thus higher likelihood to be named as the cluster head (CH) in each round. In T-SEP protocol, all sensor nodes are sent haphazardly in nature. On the off chance that the larger part of the sensor nodes is sent far from the base station (BS) it devoured more vitality [7]. The ordinary sensors are conveyed closest to the base station and transmit information straightforwardly to the sink. In any case, the advanced sensors are sent far from the base station and they devoured more vitality for the transmission of information from the sensor sensor to sink. Hence, to expel the confinement of energy in nodes happening a cluster head (CH) development. T-SEP protocol performs better when contrasted with LEACH protocol in the term of dependability time of system [9].

C. Energy Efficient Heterogeneous Clustered based Routing (EEHCR) Protocol

To improvement of LEACH and SEP protocol in WSNs that an EEHCR protocol is utilizes to increase the scalability, stability period of network and increase the lifetime of network. Basically it is applicable to ensure that increase the residual energy of sensor node in WSNs. EEHCR protocol is a distributed competitive unequal clustering approach, it considered a residual energy and average energy of sensor nodes. Similar to that of different energy efficient protocols like as LEACH, SEP, Z-SEP, SEP, A-LEACH our proposed schemes are follows cluster head (CH) formation technique [8]. In WSNs due to high quantity of node deployment, same area may get covered by large number of sensor nodes. Therefore, to avoid data redundancy, some nodes may be turned-off. So in this technique, at half of sensor nodes are perform i.e. known as active nodes and some nodes are in rest i.e. called sleep nodes or passive nodes [8].

RELATED WORK

Some work related to this strategy is described below Akyildiz i., et al. [2002] presented a survey on WSN routing protocol. WSN has number of characteristics to satisfied like accuracy, fault tolerance, power consumption, delay, throughput, energy efficiency, lifetime of sensor nodes, packet delivery ratio, packet loss etc. these requirements help in the development in new research ideas [1]. Biradar R., et al. [2010] provided a review of the various fields in which WSNs has been employed, design issues of routing protocols like as LEACH protocol, SEP protocol, M-GEAR protocol and compared them on the basis of parameters like power consumption, efficiency, delay, data aggregation, scalability [3]. Singh S., et al. [2010] presented a review of the characteristics, applications and design issues in WSNs. Also a different types of protocols like as LEACH protocol, SEP protocol and HEED protocol has been explained. The conclusion obtained is that there is a need for more reliable, more scalability and energy efficient routing protocols [2]. Faisal S., et al. [2011] implemented a Zonel stable election protocol (Z-SEP) protocol and it compared with the LEACH protocol and SEP protocol. Simulation results show that Z-SEP protocol enhanced the stability period, throughput, network lifetime, data aggregation and efficiency that existing protocols like LEACH protocol and SEP protocol [4]. Nadeem Q., et al. [2013] designed a Multi hop- gateway based energy efficient routing protocol (M-GEAR) protocol for the minimum consumption energy. Simulation results show that our proposed gateway based protocol in better in terms of network lifetime, stability period and throughput [6]. Pramanick M., et al. [2014] had compared LEACH protocol, SEP protocol, Hybrid energy efficient distributed protocol (HEED) protocol on the basis of number of alive nodes, number of dead nodes, number of clusters and number of cluster heads (CH). They concluded that SEP protocol is best in selection of cluster heads (CH) [7]. Chawla H., et al. [2014] provided knowledge of the various applications like as area monitoring, environmental, air pollution monitoring, forest fire detection, land slide detection, water quality monitoring etc and the security issues of Wireless sensor network (WSN) [8]. Javaid N., et al. [2014] designed a Application aware threshold based centralized energy efficient cluster protocol (ATCEEC) Protocol and simulation results show that ATCEEC protocol yields maximum network lifetime, throughput and stability period of network as compared to the selected protocols like as LEACH protocol, SEP protocol and M-GEAR protocol [9]. Pramanick M., et al. [2015] introduced Energy aware sleep scheduling clustered based routing protocol (EEHCR) Protocol. The aims of this scheme are, increased stability period of wireless network and minimizes the loss of data and Performance analysis show that EEHCR has significant improvement over existing protocols LEACH protocol, SEP protocol and M-GEAR protocol in terms of lifetime of network and data units gathered at base station (BS) [12]. Dewli N., et al. [2015] analyzed and compared two wireless sensor network (WSN) protocols, Multi hop- gateway based energy efficient routing protocol (M-GEAR) protocol and

modify low energy adaptive clustering hierarchy (MODLEACH) protocol on the grounds of network lifetime, throughput and performance of the network [14]. Anisi M., et al. [2015] proposed a data routing scheme which ensures increased network lifetime by exploiting energy efficiently, supporting reliability, fast delivery of delay-sensitive data and achieving low-cost sensor design. Author's founds that ability to use in both event-driven and query-driven applications, ensuring taking the shortest routing path, transmitting very less number of packets, simplifying the implementation, maintaining the routs, high probability of completeness of responses while realizing significant power savings and increasing the network lifetime [15].

SIMULATION SETUP

The network is simulated by network simulator 2.35 (NS 2.35). NS 2.35 tool is also downloaded and install in Ubuntu 12.04 version.

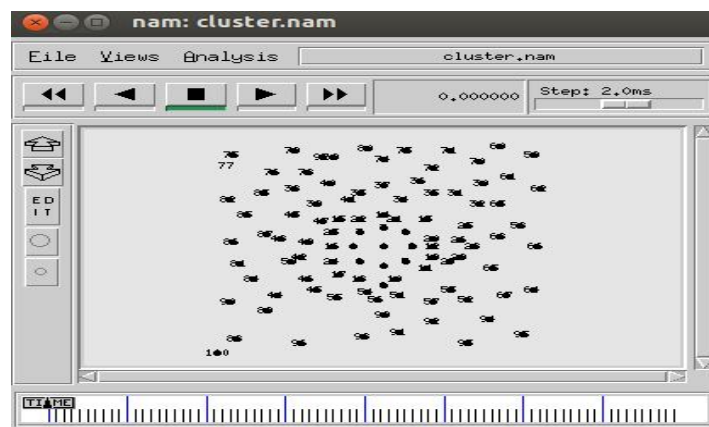


Figure-1: Network Deployment

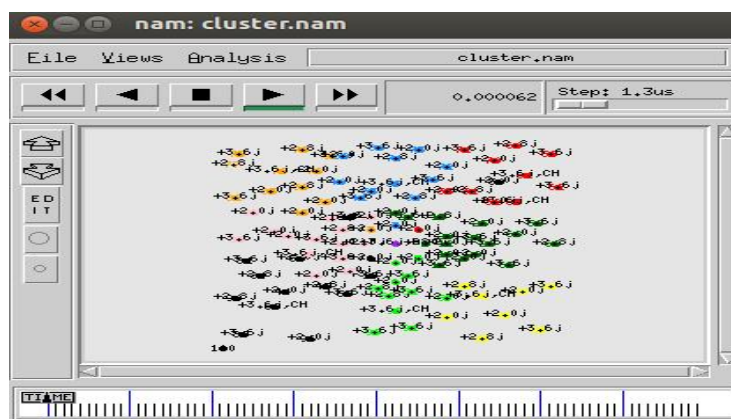


Figure-2: Data Aggregation from CHs

Network simulator 2.35 specifies the IEEE 802.11 standard. The simulation network used a two dimensional view. This simulation defines the size of network area and number of sensor nodes is deployed in network region. In the simulation, show that the process of clustering by the using of concept network animation. Network animation shows the concept of transfer the packets from sensor nodes to base station (BS).

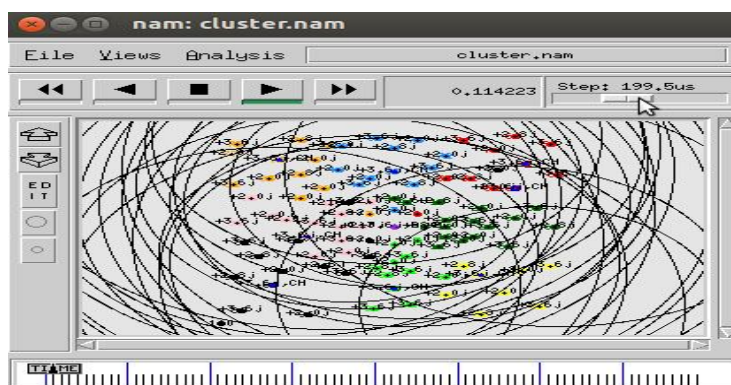


Figure-3: Data transmission from CHs to Sink

The desired specifications of network and its other details are shown in the form of table given below:

Table-1: Network configuration

Parameter	Specifications
Simulation Tool	Network Simulator 2.35
IEEE Standard	IEEE 802.11
Protocol	EEHCR, LEACH, SEP
Total Number of Nodes	100
Total Number of Cluster Head (CH)	8
Network Size (in meters)	500*500 meter
Node Range	50 meter
Sink	1

The figure 1 shows the network deployment, figure 2 shows the data aggregation from all the cluster heads (CHs) and figure 3 shows the data transmission from CHs to base station (BS).

RESULT & DISCUSSIONS

The sensor nodes are deployed randomly and clustering process is used to minimize the coverage area. Another, x-axis defined number of packets per seconds and y-axis are defined simulation time in seconds.

Figure 4 shows the result of delay in graphically. The time required through the packets to reach the base station is called as a end – to – end delay. We compare the EEHCR protocol with LEACH and SEP protocol in this paper and more delay in LEACH and SEP protocol because of dynamic clustering. In EEHCR protocol, delay has less as compared to LEACH and SEP protocol.

The number of packets is not reach the sink at the time of transmission is known as a packet loss. Figure 5 shows the packet loss is less in EEHCR protocol as compared to LEACH and SEP protocol because the use of multihopping transmission technique. Otherwise SEP protocol is multi-level heterogeneous network and LEACH protocol is an example of homogeneous network. EEHCR protocol has equally works on heterogeneous and homogeneous networks but it is proposed that works satisfactorily in heterogeneous networks.

Figure 6 shows the result of throughput in graphically. The number of packets are received through the base station (BS) per unit time is known as a throughput. Simulation result shows that the EEHCR protocol performs better as compared to LEACH and SEP protocol.

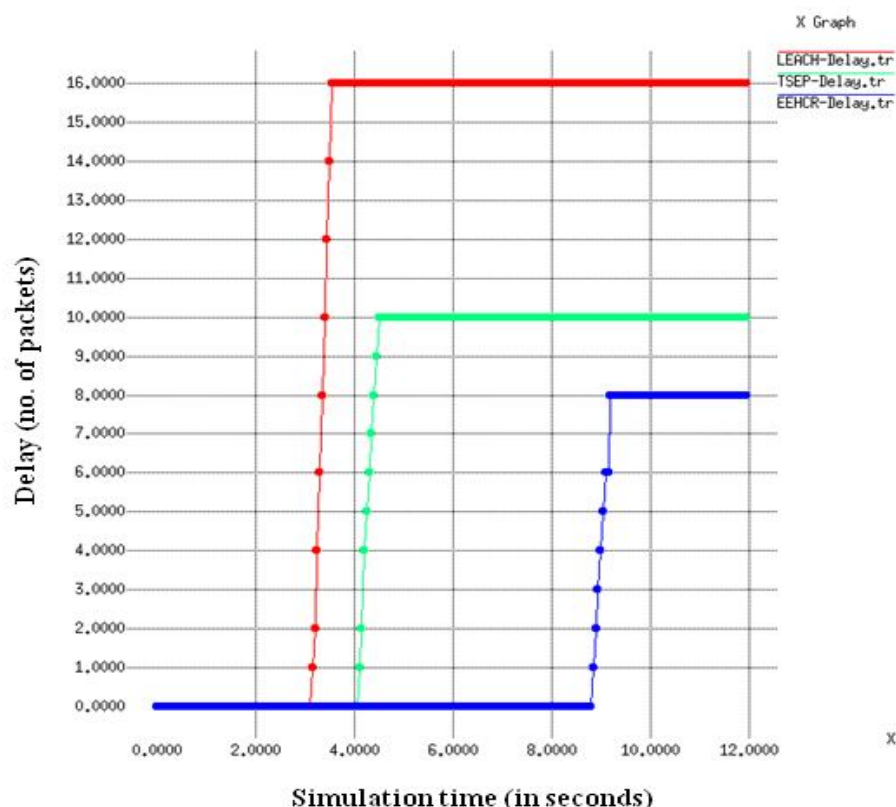


Figure-4: End – to – end Delay

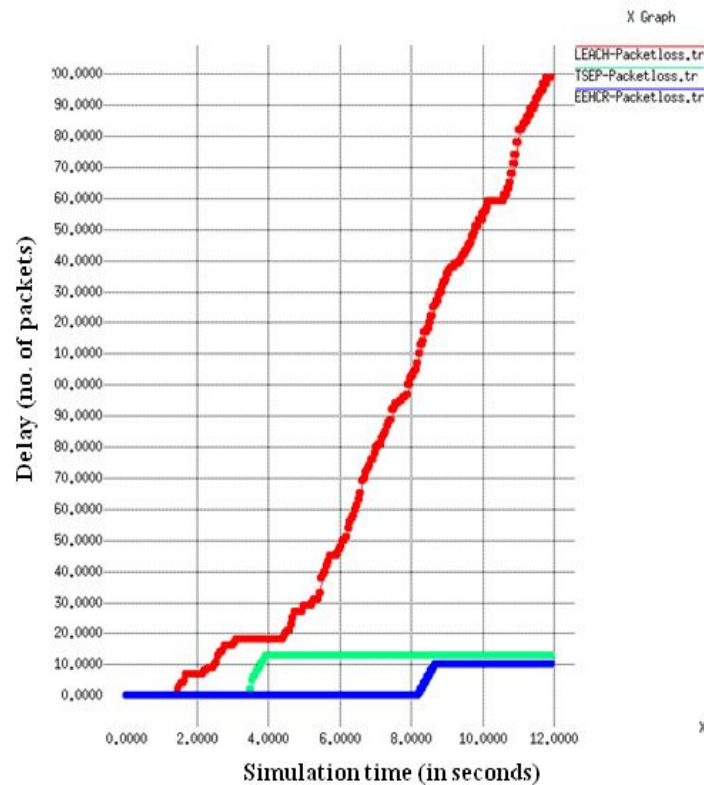


Figure-5: Packetloss

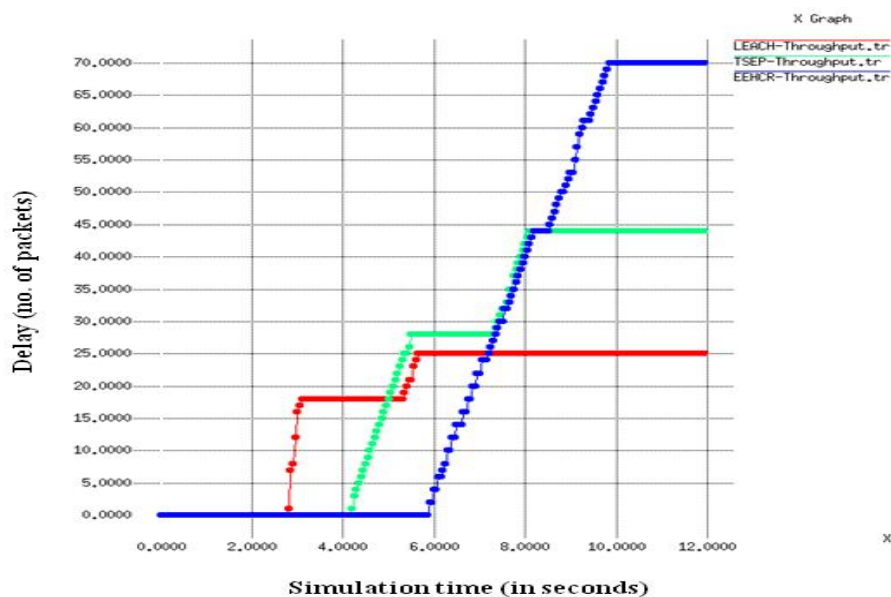


Figure-6: Throughput

CONCLUSION

Different techniques are applicable to implement wireless sensor network for the increased of lifetime of wireless network, but still need improvements to overcome the limitations of wireless sensor network (WSN). In this paper, we have evaluated the performance of EEHCR protocol. The results of EEHCR protocol is compared with LEACH AND SEP protocol by the using of QoS parameters. It performs better as compared the others protocols i.e LEACH and SEP protocol. Further the performance of EEHCR is needed to improve for the higher efficiency and accuracy in terms of delay and Packet Loss

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THE ISSUES AND PROPOSED SOLUTION BEHIND THE AUTOMATIC FRIEND SUGGESTIONS FEATURE

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ABSTRACT

Social Networking Sites (SNS) helps people make contacts that would be good for them to know, but that

they would be unlikely to have met otherwise. Facebook is the most admired free SNS which is making people throughout the world come close using its feature People You May Know. But the business policy of Facebook of connecting pinnacle of people is literally hindering the privacy of its users. In this paper we are going to take the case study of facebook and examine the troubles faced by users due to the People You May Know friend suggestion feature . We are going to propose a solution to the problem using the notion of discrete mathematics and data structures using C-language.

Keywords: SNS – Social Networking Sites, DFS – Depth First Search, Adjacency Matrix , Path Matrix, Facebook, People You May Know

INTRODUCTION

“Facebook”, the largest social network ever analyzed [2], has one trade motive of connecting more and more people across the globe. As of the second quarter of 2018, Facebook had 2.23 billion monthly active users [3]. With users in billions, Facebook is striving to link these people on a large scale using many attributes. One such feature and our centre of discussion in this paper is “People You May Know” which the Facebook has been using since 2008 [4].

CASE STUDY

People You May Know: People you may know is a Facebook tool which surfaces profiles of other users which Facebook thinks we may have a connection with, so that we can add the other profile into our network. According to Facebook, these suggestions come from some pretty common and surface level data like:

- Mutual Friends (having friends in common)
- Members of same Facebook group
- Members tagged in the posts
- Members having same organisational data e.g. same school, university or work place

Contacts uploaded (like contacts synced from mobile phones or other accounts)

Now there are many evidences (mentioned below) which show that above is not the only criteria followed by Facebook to show suggestions in People You May Know section. Facebook says that the help centre content is accurate and reflects the most common types of information that inform suggestions [5], which shows that there are some less common types of data which comes into play. This creates the confusion and disturbance in the privacy of billions of Facebook users.

Following are few case studies of the problem created by People You May Know feature of Facebook:

- A Facebook user posted this on the Facebook help centre wall: It is suggesting people with whom I have no shared contacts and whose profile pictures are clearly pornographic. I deleted them on my home page, but from what I read on your helpdesk, they are likely hanging around on my Friends page. I don't want to click on their profile, click on the picture, and then report it. How do I make them go away?[6]
- An article from Forbes shows the complaint of a Facebook user: This morning Facebook suggested my scary ex out of nowhere. There's no contact information in my phone or shared friends with said entity. I pressed for any commonalities and there were none, not with email, not with the previous profile -- nothing [7]. What if Facebook is suggesting people that are actively searching for you -- whether they be long lost relatives or straight up stalkers?
- A user posted on Reddit: My Facebook app on my iphone suggested 1 friend a person who turned out to be the receptionist at my psychiatrist's office, where I had only been once or twice. I hadn't posted from or (god forbid) checked in at the office. I had only checked/read the news feed while waiting [8].

Hence it is proved that this feature is actually weirdly disturbing the privacy of many users. In this paper, we are going to propose an effective solution for this problem so that every user can see only known and useful suggestions in the People You May Know section.

Methodologies Used - Discrete Mathematics and Data Structures [9]

Tools Used TURBO C++ [10]

PROPOSED SOLUTION USING GRAPH THEORY

Before jumping directly to the solution part, we have to understand the implementation of Graph Theory into the large network of Facebook. Consider the whole web of Facebook as an undirected weighted graph in which each node corresponds to a Facebook user and each undirected edge corresponds to the friendship between two users and the weight on each edge shows the degree of interaction between two users.

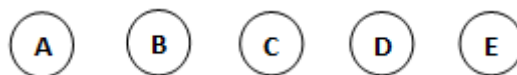
Here we are using undirected graphs as direction has no role in friendship links because if a user A is friends with user B then in the same way user B is also friends with user A, so their facebook friendship is shown in graph theory as follows:

Now the weight of each edge is calculated with the procedure explained as follows

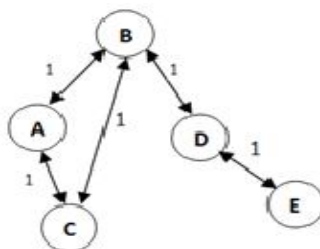
Table No-1

Activity Performed	Accordingly increment/decrement in weight of edge
Became friends by accepting friend request	+1
Liking friend's post	+1
Commenting on a friend's post	+5
Tagging a friend on a post	+10
Posting something in friend's wall	+10
Unliking a post	-1
Deleting a comment	-5
Untagging (either way)	-10
Deleting your post from a friend's wall	-10
Unfriending/blocking	Edge destroyed

Let us consider an undirected weighted graph named G representing a friend chain. Let this friend chain contains 5 Facebook users A, B, C, D and E. Originally, let all of these users are not connected to each other then their corresponding graph will look like below $G(v,e)=(5,0)$



Lets us consider that some of them send friend requests to other members of the set and after accepting those friend requests, there will exist a friendship graph (undirected and weighted) and let that graph look like given below



The graph depicts that

A is friends with B and C,

B is friends with A, C and D

C is friends with A and B

D is friends with B and E

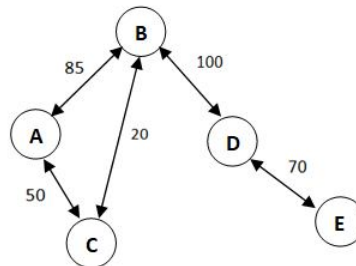
E is friends with D

Since weight value decide for accepting friend request is 1.

Therefore $e(A,B)=1$, $e(A,C)=1$, $e(B,C)=1$, $e(B,D)=1$ and $e(D,E)=1$

Also the graph is undirected so it should be kept in mind that $e(A,B)=e(B,A)$

According to the criteria followed by People You May Know feature, A will get the suggestion of both D and E, B will get the suggestion of E, C will get the suggestion of both D and E, D will get the suggestion of both A and C, E will get the suggestion of A, B and C. This may look fine for a network chain consisting of only 5 users, but facebook uses this norm for the friendship chains containing millions of users. This is the main reason of getting random unknown suggestions or getting suggestions of a person you met many years ago.



To overcome this difficulty we are going to set some protocols for getting these suggestions. Before that lets take this data one step ahead. Let us suppose that in a period of say 1 month, these users perform many activities with each other and start gaining more weight on their corresponding edges (according to Table No 1). After 1 month let the graph depicts like shown below

Here $e(A,B)=85$, which means that the activities performed between users A and B gets the combined value of 85.

Similarly, $e(A,C)=50$, $e(B,C)=20$, $e(B,D)=100$ and $e(D,E)=70$

Now we will set a minimum scale, let it be of value 80, so that if a user has edge weight of 80 with another user only then he can get suggestions from the friends of second user and that will also be possible only if the edge width of that mutual friend is 80 or above with his other friend and so on.

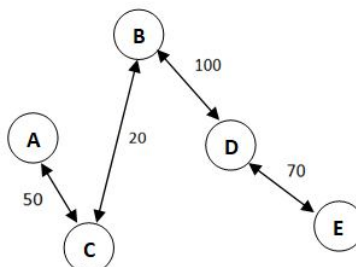
Hence in above case, user A will get the suggestion of user D as $e(A,B)>80$ and $e(B,D)>80$.

Here user B will not get the suggestion of user E because $e(D,E)<80$, and this will automatically depict that user A will also not get the suggestion of user E.

In the same way user C will also get the suggestion of user D only and not user E.

Let us suppose that at some point of time, A unfriends or blocks B. Then the graph will look like

Now, in the current scenario user A will not get suggestions of any other non-friend user as currently he has only one friend i.e. C, but $e(A,C)<80$



As we all know that as the time changes, bond of friendship also changes due to which the number of activities taking place between two facebook friends will keep on changing, it may increase at some point of their lives and it may decrease at some other point. And many of the times we stop being in touch with friends who were very special at sometime for us. But we keep getting suggestions of new friends of our old friends. To overcome this issue, our programme will keep on calculating the edge width at the starting of every month to keep a check on the people who are currently important in your lives.

So the whole procedure will go like this, once a user say X accepts the friend request of a user say Y, our programme will start calculating the edge weight between X and Y from the time of acceptance of the request.

X will not get any suggestion of some other friend of Y till it get the edge weight value 80. Once $e(X,Y)=80$, X will start getting suggestions of those friends of Y whose edge weight with Y is more than or equals to 80 and so on. At the end of the month our programme will clear the account by making each edge weight back to zero and will start calculating again with the previous mentioned criteria.

The coding of above solution is as follows

```
#include<stdio.h>

#include<stdlib.h>

#include<conio.h>

#include<time.h>

#include<dos.h>

static float count=0,count1=0,count2=0;

int choice1,choice2;

void timing(int,int);

void activity();

time_t timer;

struct tm *tblock;

// A structure to represent an adjacency list node

struct AdjListNode

int dest;

struct AdjListNode* next;

// A structure to represent an adjacency list

struct AdjList

struct AdjListNode *head;

// A structure to represent a graph. A graph

// is an array of adjacency lists.

// Size of array will be V (number of vertices// in graph)

struct Graph int V;

struct AdjList* array;

// A utility function to create a new adjacency list node

struct AdjListNode* newAdjListNode(int dest)

struct AdjListNode* newNode = (struct AdjListNode*) malloc(sizeof(struct AdjListNode));

newNode->dest = dest;

newNode->next = NULL;

return newNode;

// A utility function that creates a graph of V vertices

struct Graph* createGraph(int V)

{ int i;

struct Graph* graph = (struct Graph*) malloc(sizeof(struct Graph));

graph->V = V;

// Create an array of adjacency lists. Size of
```

```
// array will be V
graph->array = (struct AdjList*) malloc(V * sizeof(struct AdjList));
// Initialize each adjacency list as empty by
// making head as NULL
// int i;
for (i = 0; i < V; ++i)
graph->array[i].head = NULL;
return graph;
// Adds an edge to an undirected graph
void addEdge(struct Graph* graph, int src, int dest)
// Add an edge from src to dest. A new node is
// added to the adjacency list of src. The node
// is added at the beginning
struct AdjListNode* newNode = newAdjListNode(dest);
newNode->next = graph->array[src].head;
graph->array[src].head = newNode;
// Since graph is undirected, add an edge from
// dest to src also
newNode = newAdjListNode(src);
newNode->next = graph->array[dest].head;
graph->array[dest].head = newNode;
// A utility function to print the adjacency list
// representation of graph
void printGraph(struct Graph* graph)
int v;
for (v = 1; v < graph->V; ++v)
struct AdjListNode* pCrawl = graph->array[v].head;
printf("\n Adjacency list of vertex %d\n head ", v);
while (pCrawl)
printf("-> %d", pCrawl->dest);
pCrawl = pCrawl->next;
printf("\n");
// Driver program to test above function
void main
// create the graph given in above figure
int V = 4, choice;
struct Graph* graph = createGraph(V);
clrscr();
printf("\n\n There are total for people 1,2,3 and 4");
```

```
printf("\n\nTo whom you want to choose the mutual friend: ");
```

```
printf("\n\nEnter your Choice: ");
```

```
scanf("%d",&choice);
```

```
switch(choice)
```

Case 1

```
addEdge(graph, 3, 1);
```

```
addEdge(graph, 2, 1);
```

```
addEdge(graph, 4, 1);
```

```
break;
```

Case 2

```
addEdge(graph, 2, 3);
```

```
addEdge(graph, 2, 1);
```

```
addEdge(graph, 2, 4);
```

```
break;
```

Case 3

```
addEdge(graph, 1, 3);
```

```
addEdge(graph, 2, 3);
```

```
addEdge(graph, 4, 3);
```

```
break;
```

Case 4

```
addEdge(graph, 1, 4);
```

```
addEdge(graph, 2, 4);
```

```
addEdge(graph, 3, 4);
```

```
break;
```

Default

```
printf("\n\nYou have Entered a wrong Choice");
```

```
printf("\n\nPRESS ANY KEY TO EXIT");
```

```
getch();
```

```
exit(0);
```

```
// addEdge(graph, 1, 3); //addEdge(graph,0,1);
```

```
// addEdge(graph, 2, 3); //0,4
```

```
// addEdge(graph, 3, 4); //1,2
```

```
// addEdge(graph, 1, 3); //1,3
```

```
// addEdge(graph, 1, 4); //1,4
```

```
// addEdge(graph, 2, 3); // 2,3
```

```
// addEdge(graph, 3, 4); //3,4
```

```
// print the adjacency list representation of the above graph
```

```
printGraph(graph);
```

```
activity();
```

```
getch();
```

```
void activity()
```

```
while(1)
clrscr();
printf("\n\n\t\t TIME TO PERFORM ACTIVITY");
printf("\n\n\t\t WITH WHOM YOU WANT TO PERFORM ACTIVITY ");
printf("\n\n\t\t 1. 1 ");
printf("\n\n\t\t 2. 2 ");
printf("\n\n\t\t 3. 4 ");
printf("\n\n\t\t ENTER YOUR CHOICE: ");
scanf("%d",&choice1);
switch(choice1)
Case 1
goto a1;
break;
Case 2
goto a2;
break;
case 3
goto a3;
break;
Default
printf("\n\n ENTERED WRONG CHOICE");
sleep(2);
activity();
a1:
while(count<=8)
printf("\n\n Which activity you want to perform: ");
printf("\n1.Tag");
printf("\n2.Comment");
printf("\n3.Share");
printf("\n4.Like");
printf("\n\nEnter your choice: ");
scanf("%d",&choice2);
switch(choice2)
Case 1
count+=1.5;
break;
Case 2
count+=1;
break;
Case 3
count+=1.5;
```

break;

Case 4

count+=0.5;

break;

default:

printf("\n\nWRONG CHOICE");

exit(0);

activity();

// printf("\n\nThe counter of count is %1.2f",count);

a2:

while(count1<=8)

printf("\n\n Which activity you want to perform: ");

printf("\n1.Tag");

printf("\n2.Comment");

printf("\n3.Share");

printf("\n4.Like");

printf("\n\nEnter your choice: ");

scanf("%d",&choice2);

switch(choice2)

Case 1

count1+=1.5;

break;

Case 2

count1+=1;

break;

Case 3

count1+=1.5;

break;

case 4:

count1+=0.5;

break;

Default

printf("\n\nWRONG CHOICE");

exit(0);

activity() a3:

while(count2<=8)

printf("\n\n Which activity you want to perform: ");

printf("\n1.Tag");

printf("\n2.Comment");

printf("\n3.Share");

```
printf("\n4.Like");
printf("\n\nEnter your choice: ");
scanf("%d",&choice2);
switch(choice2)
Case 1
count2+=1.5;
break;
Case 2
count2+=1;
break;
Case 3
count2+=1.5;
break;
Case 4
count2+=0.5;
break;
default:
printf("\n\nWRONG CHOICE");
exit(0);
activity();
if( (count>=8) && (count1>=8) )
count=count1=0;
timing(1,2);
break;
main();
if( (count>=8) && (count2>=8) )
count=count2=0;
timing(1,4);
break;
main();
if( (count1>=8) && (count2>=8) )
count1=count2=0;
timing(2,4);
break;
main();
void timing(int x,int y)
int min=0,sec=0;
clrscr();
for(min=1;min<=2;min++)
// printf("\nThe min is: %d",min);
```

```
for(sec=1;sec<=60;sec++)  
/* gets time of day */  
timer = time(NULL);  
/* converts date/time to a structure */  
tblock = localtime(&timer)  
printf("\n\n\t\tThe time is: %s", asctime(tblock));  
printf("\n\n\n\t\t%d YOU HAVE A FRIEND SUGGESTION OF %d ", x,y);  
sleep(1);  
clrscr();  
// printf("\nThe min is: %d",min);  
// clrscr();
```

CONCLUSION

With Social Networking Sites like Facebook, the world is getting three a bit degree of separation closer. This distance is getting closer and closer as more and more people are signing in to such social networks. The world is much more closely connected to each other than one might think. Technology is working on it day by day to reduce the degree of separation to almost null. We are having no doubt that sooner or later with the help of more efficient techniques, methodologies and tools we will almost nullify the geographical distances between every individual. Though technology is performing a tremendous job in connecting people across the world, some systematic measures should also be taken to make these connections between people more real, valuable and filtered. Where the main concentration is on reducing the degree of separation, some constraints must be applied on the methodologies to make it more authentic and real. This will exactly serve the purpose of a good Social Networking site and the definition of degree of separation will become more accurate in real world scenario.

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ANALYSIS OF WEIGHTED VISIBILITY GRAPHS IN EVALUATION OF AUSTIM SPECTRUM DISORDER AND EPILEPSY RELATIONSHIP

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ABSTRACT

Preliminary evidence have documented the applications of weighted Visibility Graphs (VGs) across various disciplines. Its application in neuroscience field is in its initial stages and has been extended to the automatic detection of epilepsy and Autism Spectrum Disorder (ASD). However, the studies relating epilepsy and ASD are insignificant in number. The motive of the present work is to explore the relationship between ASD and epilepsy by transforming the single channel Electroencephalogram (EEG) signals into weighted VGs. The characteristics of the obtained network are extracted using the six complex network features (such as assortativity, modularity, average weighted graph, hierarchical complexity, graph index complexity, entropy). The combined effect of these features has been evaluated using Support Vector Machine (SVM) and K-Nearest Neighbor (KNN) machine learning classifiers. The experimental results reveal the relation between ASD and epilepsy through the combined effect of HC-, assortativity, entropy-modularity, entropy-GIC with an accuracy of 99.2%. The other factor such as AWG has the potential to distinguish ASD and epilepsy with an accuracy of 99.2%. In sum, the present findings suggest that ASD and epilepsy share a common underlying mechanism and are closely related. This relationship can further lead to improved clinical diagnosis and intervention now

Keywords: Autism Spectrum Disorder, Epilepsy, Visibility Graph, Weighted, Relation

INTRODUCTION

The most prevailing brain and developmental disorders that affect the individuals' thought process, perception, behavior and daily routine include: epilepsy, schizophrenia, Autism Spectrum Disorder (ASD), intellectual disability and depression [1]. Despite the continuous research in providing efficient, computer-aided, less subjective and automatic methods [2], the doctors still rely on subjective methodologies such as questionnaires or interviews and visually inspect the brain signals such as Electroencephalogram (EEG) signals for detecting disorders. This dependency on the traditional beliefs misdiagnoses other co-occurring disorders and lead to unawareness among people. Moreover, the co-occurrence of these disorders further poses the problem and eventually leads to poor diagnosis. For example, the occurrence of ASD in epilepsy has much higher possibility than other disorders like intellectual disability. The statistics and meta-analysis studies reported that the rate of co- occurrence of ASD and epilepsy is nearly 30% among the individuals and epileptiform discharge rate is 60% in case of absence of epilepsy [3, 4]. This suggests that ASD and epilepsy are the co-morbid conditions which reveals that certain underlying neurobiological mechanisms are common between these disorders. The individuals who are suffering from frequent and early age seizures have maximum chances of being affected with ASD [5, 6]. The age at which epilepsy can be expected in ASD is around infancy and puberty, and in the majority it affects around puberty [7, 8]. The studies in different domains have provided different phenomenon leading to the disorder bidirectional relationship. Some of the findings are:

- (i) Various animal models (especially rodents or mice) have been used to genetically understand the ASD and the epilepsy phenotype [9].
- (ii) Variations in the genetics and neuropathological mechanisms such as hyper-excitation in minicolumn circuits, abnormalities in the GABA neuro- transmission and EEG (temporal lobe) define the symptoms observed in seizures as well as ASD [10].
- (iii) Multiple studies have provided an evidence of genetic and metabolic disorders, vitamin (cobalamin and folate) and mineral deficiencies and immunity dysregulations [10]. These atypicalities lead to decreased inhibitory or increased excitatory brain balance.
- (iv) Anxiety, sleep problems [7] and environmental factors such as air pollution and exposure to other chemicals [11].
- (v) Questionnaire based studies [12] and regression of language and behavior in ASD and epilepsy [13].
- (vi) The studies after statistical analysis have reported lower IQ level, age, gender, and various co-morbidities as the common mechanisms shared by ASD and epilepsy [14].

The symptoms of both the disorders overlap and individuals with seizures show impairments which are also found in ASD, such as cognitive delay, aggression, repetitive and irritable behavior which further delays the diagnostic process. Also, due to the communication deficits and behavioral abnormalities, the symptoms of seizures remain unrecognized and undiagnosed in ASD. Moreover, the inter-ictal epileptiform discharges leads to the uncertainty that whether it is due to ASD or brain dysfunctionalities. Therefore, it is not clear whether ASD is primary and epilepsy is secondary condition or epilepsy is primary and ASD is secondary. Thus, making it difficult to differentiate individuals with seizures and ASD at an early age and they remain poorly understood. Although the literature fails in providing convincing evidence that can exactly associate ASD and epilepsy and can provide the distinguishing biomarkers, yet it points to the possibility that a common mechanism is shared by the disorders.

There is a plethora of methodologies to detect these disorders individually ranging from linear approaches such as time-frequency analysis for extracting power spectral density, correlation, variance and other features to non-linear approaches that includes: fractal dimension, Lyapunov exponent and time-domain analysis (graph theory, Visibility Graphs (VG)). In recent literature, the non-linear methods have gained major interest and provided more accurate diagnosis (see Table 1) and the analysis of EEG like non-stationary signals have been proven better in time-domain in comparison to other methods [15]. Although, the use of VGs and weighted VGs in detecting ASD and epilepsy is in its initial phase, yet it has diagnosed ASD with an accuracy of 93.75% [16, 17] and even reported the variations in different neuro-developmental disorders [18].

TABLE 1: SURVEY OF NON-LINEAR ANALYSIS OF NEURO-DEVELOPMENTAL DISORDERS.

Dataset	Parameter Measured	Classifier	Finding
EEG; Own Dataset	Higuchi's Fractal & Katz's Fractal Dimension	Radial Basis	Katz's fractal dimension investigated significant differences in delta and gamma band and diagnosed ASD with an accuracy of 90% [19].
MEG, EEG Public Dataset	Average Strength, Clustering Coefficient, Assortativity, Efficiency of Graphs	SVM	Discriminated ASD from controls with 93.75% accuracy. Interdependence strength within & between bilateral frontal & temporal sensors is quite less [20].
EEG; Own Dataset	Multi-scale Entropy	Statistical Analysis	Reported atypicalities in the neural integrative capacity and information processing in ASD [21].
EEG; Own Dataset	Graph index & Off-diagonal Complexity of VG	Statistical Analysis	Graph index complexity of gamma band discriminated ASD from non-ASD children [16].
EEG; Own Dataset	Fractal Dimension by using improved PSVG	EPNN	Reported alterations in gamma, beta, and alpha bands of ASD individuals with 95.5% accuracy [17].
fMRI; Public Dataset	Interlayer Mutual Information, degree distribution of VG	Kolmogorov -Smirnov Statistic	Reported variations in the brain activity of several disorders such as schizophrenia, ADHD and bipolar disorder [18].
EEG; Own Dataset	Degree Distribution in Difference VG, Degree Entropy	SVM	Better approach for detecting seizures in comparison to other existing methods. It can be extended for improving seizure detection in individuals with ID [22].

(ADHD: Attention-deficit Hyperactivity Disorder; DT: Decision Tree; EEG: Electroencephalogram; EPNN: Enhanced Probabilistic Neural Network; fMRI: functional Magnetic Resonance Imaging; ID: Intellectually Disable; NB: Naïve Bayes; KNN: K-Nearest Neighbor; PSVG: Power of Scale-freeness of VG)

Apart from this, the advantages of VGs are [18]: (i) efficient in extracting out information from noisy signals without posing any restriction or hypothetical assumption (ii) deals with non-stationary, uni-variate and multivariate time-series (iii) better understanding of interdependent activities in the brain signals. The term 'weighted' in VG represents the strength of the edges between the connected nodes [22, 23].

This weight can help in detecting the sudden fluctuations of EEG signals that can eventually help in discriminating the potentially weak and insignificant connections of the nodes. Thus, both the natural as well as weighted VGs have provided an efficient methodology in finding the underlying brain complexities and discriminating different EEG signals. The weighted VGs concept has been implied in detecting seizures by computing modularity, Average Weighted Degree (AWG) and entropy. These features have explained the clusters or groups of the connected nodes but fails to explain the hierarchical structure of brain topology. The hierarchy of connected nodes is an important parameter to understand brain complexity and topology with more ease [24]. The novelty of the present work is to introduce hierarchical complexity as one of the features for evaluating weighted VGs of EEG signal. The present paper has implemented the weighted concept provided in [15].

The motive of the present paper is to provide representative and promising characteristics that can investigate the relationship between ASD and epilepsy as well as can explore the hidden information from the brain EEG. In order to diagnose the brain abnormalities at early age, provide timely interventions and improve individuals' quality of life, there is a need to identify ASD in children with epilepsy and vice-versa. The present work has analyzed EEG signals of ASD and epilepsy affected individuals using the weighted VGs and complex network parameters set. The different features extracted are: assortativity, entropy, Graph Index Complexity (GIC), modularity, AWG, hierarchical complexity. These features have been fed to classifiers: Support Vector Machine (SVM) and K-Nearest Neighbour (KNN) to find the more accurate set of parameters for defining ASD and epilepsy relationship. To the best of our knowledge, the use of weighted VGs and computing hierarchical complexity is a new concept in detecting epilepsy and ASD.

METHODOLOGY AND DATA COLLECTION

A. Methodology

The methodology of the present work has been provided in the form of a block diagram (see Fig. 1). The proposed approach includes conversion of pre-processed EEG signals to weighted VGs, extracting different complexity based features and then classifying the signals for comparing the Epilepsy and ASD subjects.

B. Data Base

The recruited participants: 20 ASD with epilepsy (15 male, 5 female) and 20 non-ASD epilepsy affected (16 male, 4 female) have already received their diagnosis, based on the international criteria, from the experienced professionals. The age of the participants lie in the range 3-10 years. The EEG data of the patients have been collected from the Apollo Hospital, Ludhiana using EEG-1200 (Neurofax, Nihon Kohden, Tokyo, Japan).

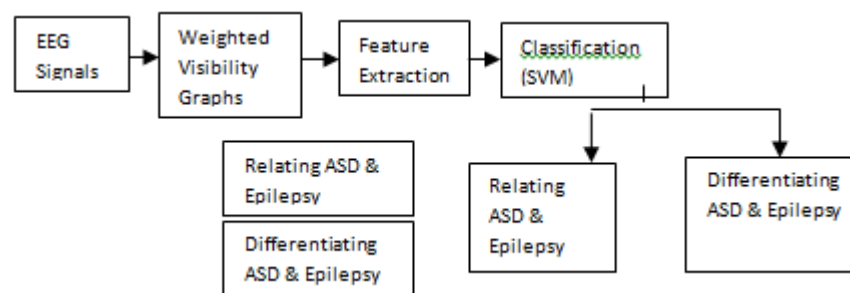


Fig-5: Block Diagram of the Proposed Work.

The signals were recorded using 22 electrodes (Ag/AgCl), following 10-20 international system, with impedance lower than 10K Ω and 128Hz sampling rate. The obtained data was pre-processed that includes: artifact detection, visual inspection, notch filtering at 50Hz. The single channel signals were obtained in Ictal (during seizure) and Interictal stages for both ASD and epilepsy affected individuals.

III. FEATURE ANALYSIS PARAMETERS

The different parameters that can be utilized for the network analysis are

1.ASSORTATIVITY: It provides the measure of correlation between the linked nodes. Its value lies in the range [-1 1], such that high values indicate perfect assortative patterns between higher degree nodes and low values indicate non-assortative. It is given by equation, adopted from [25]:

$$\rho = \frac{\sum_{x,y} xy (e_{xy} - v_x v_y)}{\sigma_v} \quad (1)$$

where $e_{x,y}$ is the joint probability of excess degree x and y , v_y represents the normalized distribution and σ_v is standard deviation of v_y .

2. *Entropy*: The entropy of any node (say x) of a weighted graph can be computed using equation [23]:

$$E = - \sum_{y=1}^n p(x, y) \log(p(x, y)) \quad (2)$$

$$p(x, y) = w(x, y) / \left(\sum_{z=1}^n w(x, z) \right)$$

where such that $w(x, y)$ represents the weight of connected nodes (x, y) .

3. *Graph Index Complexity*: It measures the heterogeneity of the edge distribution [26]. It lies in the range $[0, 1]$, with higher values depicting the complexity of the graph. For any VG, with adjacency matrix $(a_{x,y})$, GIC is given by [26]:

$$GIC_{\lambda_{\max}} = 4g(1 - g) \quad (3)$$

where λ_{\max} is the eigen-value of $(a_{x,y})$, and

$$g = \frac{\lambda_{\max} - 2 \cos(\pi / (q + 1))}{q - 1 - 2 \cos(\pi / (q + 1))} \quad (4)$$

4. *Modularity*: This parameter measures the partition strength of a network into different modules or clusters [27, 15]. Its value lies in the range $[-1, 1]$ such that the high modularity values indicate that connections between the nodes of same communities are very close but scattered between nodes of different communities and vice-versa. It is given by the equation, adopted from [28]:

$$Q = \frac{1}{2m} \sum_{x,y} \left(A_{x,y} - \frac{k_x k_y}{2m} \right) \delta(n_x, n_y) \quad (5)$$

where m is the total number of edges, $A_{x,y}$ represents the edge weights, n_x and n_y is the cluster name of node x and y , $\delta(n_x, n_y)$ has value 1 if node x and y represents same cluster and 0, otherwise.

5. *Average Weighted Degree*: It is the average of the sum of the weights of all the edges that are attached to other nodes in the entire network. The equation used to compute the weighted degree is given as, adopted from [29]:

$$WD_x = \sum_{y \in N(x)} w_{x,y} \quad (6)$$

where $w_{x,y}$ represents the weight b/w node x and y and $N(x)$ is the relative neighborhood of node x .

6. *Hierarchical Complexity*: The hierarchical complexity in a network is determined by nodal degree such that very dense nodes exist on the high levels and sparse nodes exist on low levels. It is given by the equation, adopted from [24]:

$$R = \frac{1}{d} \sum_{d_l \neq 1} \frac{1}{l(r_l - 1)} \left(\sum_{y=1}^l \left(\sum_{x \in d_l} (s_{lx}(y) - \gamma_{ly})^2 \right) \right) \quad (7)$$

where d is the number of different degrees, $s_{lx}(y)$ is the y th element of x th length sequence (l) , r_l represents the total number of nodes with degree l , γ_{ly} is the mean value. This complexity is for irregular and unpredictable signals such as brain signals or other real world phenomenon, but has no meaning for regular, random or repetitive patterns [30].

These features are the fed to the SVM and KNN classifier to provide the features that can distinguish as well as can relate epilepsy and ASD. It has been found that the combination of these complex features can yield better accuracy in comparison to individual parameters [15]. In the present paper, the performance of the classifier has been evaluated using the different efficient combination of the features.

IV. RESULTS AND DISCUSSION

The VGs of EEG signals of ASD and epileptic individuals has been shown in Figure 2. The figure has clearly reflected that Interictal stage EEG is less complex than and Ictal stage for both epilepsy (see Fig.2:a,b) and ASD (see Fig.2:c,d). The complexity of ASD-Ictal VG is more in comparison to epilepsy that indicates more connected network in ASD. In order to find the significant differences in the brain complexities, the extracted feature set has been statistically analyzed using paired-sample t-test (see Table 2). The tabular data have shown the mean differences of features of EEG signals of both the groups (ASD, Epilepsy) in the Ictal and Interictal stage. The assortativity decreases in Interictal stage and interestingly, the positive difference in the assortativity reflect a segregation of the brain network into the groups that are sparsely interconnected.

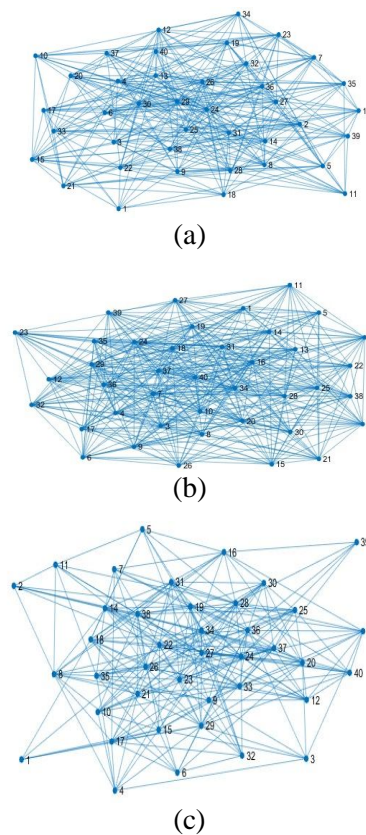


Figure-2: (a) Epilepsy-Interictal (b) Epilepsy-Ictal(c) ASDInterictal (d) ASD-Ictal

The modularity decreases in Ictal stage and AWG has significantly increased in Ictal stage for both the groups. The HC and assortativity are higher in Ictal stage for both the groups than Interictal stage.

Table-2: Paired t-test on Feature Set.

Features	Ictal Stage- Interictal Stage		Group
	Mean	t-test	
Assortativity	0.61944	t(499)=-4.197, p=0.0001	ASD
Entropy	-0.13662	t(499)=0.981, p=0.333	
GIC	0.00375	t(499)=-8.299, p=0.0001	
Modularity	-0.15529	t(499)=12.227, p=0.0001	
AWG	225.4491	t(499)=-14.230, p=0.0001	
HC	0.29112	t(499)=-6.405, p=0.0001	
Assortativity	0.34660	t(499)=-2.926, p=0.006	Epilepsy
Entropy	-0.13239	t(499)=1.096, p=0.2820	

GIC	0.00518	t(499)=-14.026, p=0.0001
Modularity	-0.15261	t(499)=12.864, p=0.0001
AWG	141.41	t(499)=-8.332, p=0.0001
HC	0.2707	t(499)=-7.984, p=0.0001

The Box plots (see Figure 3-a,b,c,d,e,f) have further depicted the differences in the features of both the groups and have shown the mean values and range upto which parameters can show variations. This statistical analysis has provided the comparison of all the features in both the stages.

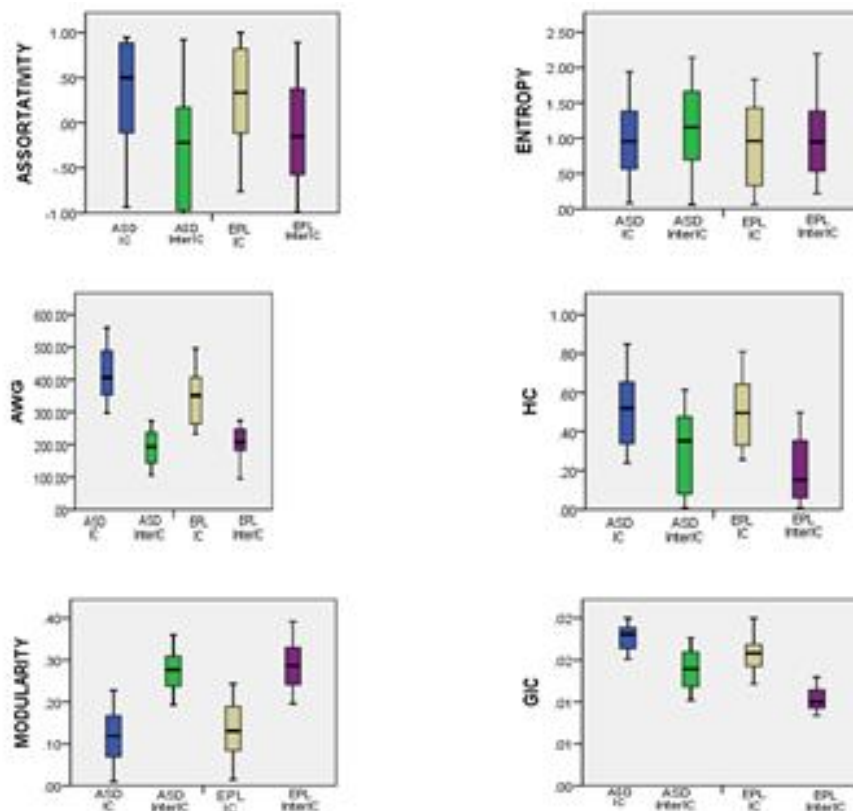


Figure-3: Box Plots of Complex Feature Set.

After statistically analyzing the individual features, the combination of the features were fed to SVM and KNN classifiers. On comparing the performance of both the classifiers, it has been found that SVM has better accuracy relative to KNN (see table 3) for all the cases.

Table-3: Comparison of Classification Accuracy

Combined Feature	SVM	KNN
Interictal	98.4	98.5
Ictal	98.7	97.2
Interictal+Ictal	99.2	97.8

The accuracy for individual stages (Ictal, Interictal) and for combined stage has been computed. The scatter plots of the combined features, some of which are shown in Fig.4, have distinguished as well as related both the disorders. The entropy Vs modularity and entropy Vs GIC plots have shown that ASD and Epilepsy patients show significant differences to each other, in both stages and possess similar patterns. The decrease in modularity values clearly explains the fact that it is difficult to form the clusters in highly noisy and chaotic signal (Ictal stage). The entropy remains same for both the groups and the low values of entropy suggests that these individuals' brain signals do not possess any order. The reduction in entropy in Ictal stage indicates that EEG of both the groups has become more ordered. The HC and assortativity is different for both the groups, in both stages, indicating that ASD with epilepsy show more complexity in comparison to epileptic individuals. But, the increase in value of HC is favoring the finding that signals have become more ordered in Ictal stage.

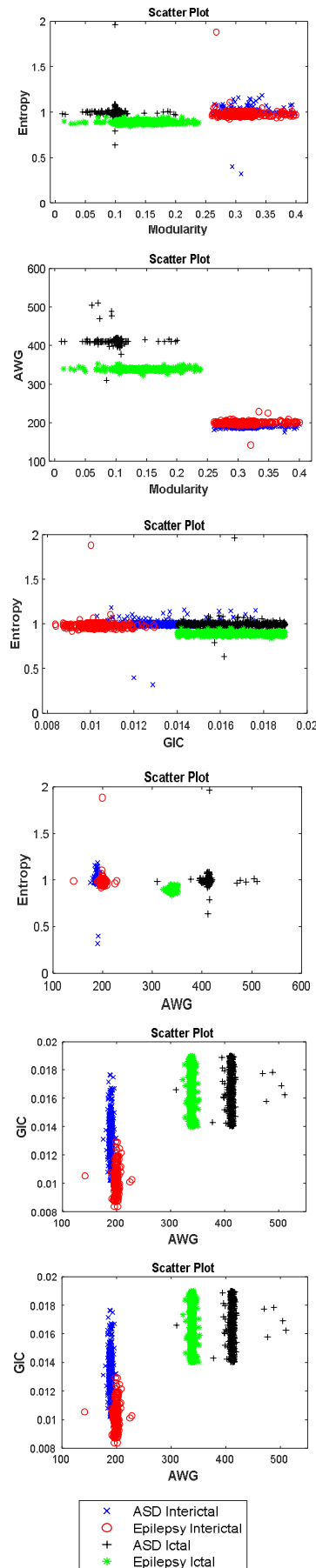


Figure 4: Scatter Plots illustrating Classification Accuracy of ASD and Epilepsy for Ictal and Interictal stages
(a) Entropy Vs Modularity (b) AWG Vs Modularity (c) Entropy Vs GIC (d) Entropy Vs AWG (e) HIC Vs Assortativity

The complexity of ASD individuals is more ordered and possess a hierarchy in comparison to epilepsy. The increase in value of assortativity suggests that signals become more correlated in Ictal stage in both groups in Ictal stage, which also favors one of the previous findings that assortativity increases during seizure [31]. The AWG Vs GIC and AWG Vs entropy plot shows that AWG is different for both the groups in Ictal stage. Thus, AWG has the tendency to distinguish epileptic and ASD individuals. In sum, all the features are pointing that ASD and epilepsy are related to each other through brain functionality and topology. The classification accuracy attained using SVM and KNN has been shown in tabular form in Table 3.

V. CONCLUSION

The present paper has investigated the relation between ASD and epilepsy using weighted VGs. The six different complex network parameters have been analyzed statistically as well as classified using SVM and KNN machine learning classifiers. The classifier has related ASD and epilepsy with 99.2% accuracy on the basis of entropy, modularity, HIC and assortativity and distinguished them through AWG. The set of these complex features related ASD and epilepsy with respect to brain functionality and topology in Ictal and Interictal stage. The findings of the present work suggest that ASD and epilepsy are related to each other and there is a need to explore this relationship with more such metrics and modalities. If the relation of epilepsy and autism will be known in advance, many risk factors can be prevented before occurrence and disorder can be managed properly. In addition, the methodologies similar to present paper can help technicians and clinicians in detecting disorder in more detailed and accurate way. Together with the individual findings in ASD and epilepsy brain signals, the present paper's findings may help to gain insights into the complicated relationship of ASD and epilepsy.

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A COMPREHENSIVE REVIEW ON SECURITY IN CLOUD COMPUTING

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ABSTRACT

CISCO has introduced the term “Inter-cloud” as “Cloud of clouds” (2013). The telephone and Internet technologies which took 100 and 15–20 years, respectively, for the realization of global federation, Organizations and individuals have been moving to the cloud computing technology looking for effective and fast computing services. Users are concerned about security and confidentiality of data stored and processed in the cloud. Data encryption is being widely employed to secure data. However, as users are using cloud to process data, strong encryption techniques are required to apply. The objective of this paper is to provide an overview of cloud computing and the security and privacy challenges. In this paper we also discuss the risks of technology, security techniques and threats for cloud data.

Keywords: Cloud Computing, Cryptography, Security

INTRODUCTION

Cloud computing has grown rapidly in last few years due to its features of greater flexibility and availability of computing resources at minimum cost. For Companies considering transferring applications to public cloud environments, security and privacy are the important concern.

NIST developed standards, rules, and minimum requirements, for all agency operations and assets to provide information about security, but these shall not apply to national security systems. NIST defined Cloud Computing as a model for enabling convenient, ondemand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or cloud provider interaction [2]. Cloud computing is a rapidly emerged computing shared resources paradigm as it enables the sharing of computing resources at more levels of abstraction, provides on-demand service over the Internet or computer network. Because of its flexibility and availability at lower cost, cloud computing is getting good attention.

1.1 Motivation Aspects for Cloud Computing

Cloud computing can be defined by various ways one of them is through its motivational aspects or features, especially those have been accepted by different firms and groups:

Shared resources: or it can be call as share pooling, where one resource is shared by many users and are pooled together for more than one consumer. On application, host or network level, resources are assigned and reassigned on-demand of consumers. This gives a sense of location independence where users cannot pinpoint exactly where there computations are being executed [2].

On-demand self-service: Without human intervention, the users can have any external resources like storage or power automatically. This is similar to autonomic computing where the computer system manages it with self management.

Global Scale: Cloud computing has the ability to locate and release resources fastly. This will allow the users to increase the resources whenever they need to address heavy loads and usage, and then decrease by returning the resources when finished.

Cost: In Cloud Computing, users pay for on a consumption basis, whereas in other utility users pay for such as electricity, water and gas. The main characteristic of cloud computing is that the computation is done in the “cloud” and remaining characteristics stem from or complement this simple fact. Many other characteristics have also been found while literature study but all are complementary to the main characteristics[4].

Reliability: Cloud computing also manages data backup, error recovery and continuity easier and less costly, because data can be found at multiple sites on the cloud provider’s network.

1.2 Types of cloud deployments

Cloud computing services characteristic from economies of scale achieved through versatile use of resources, specialization, and other practicable efficiencies. However, cloud computing is an emerged form of distributed

computing that still exists. All clouds are not the same. There are three different ways to deploy cloud computing resources: public cloud, private cloud, community and hybrid cloud[3].

- **Public cloud**

A public cloud is one in which the infrastructure and security that it comprises are made available to the enterprises over the Internet. Cloud provider as owner of it, sell cloud services and, is external to company. And the reciprocal spectrum is private cloud.

- **Private Cloud**

A private cloud in which the computing environment is used exclusively by one organization. It is maintained either by the organization or a third party, and may be physically located within the organization's on site data centre or outside of it. Private clouds are used by any mid- to large-size organisations seeking enhanced control over their environment.

- **Community cloud**

A community cloud is somewhat similar to a private cloud, but the infrastructure and computational resources are shared by several organizations that have common privacy, security, and regulatory considerations, rather than for the exclusive use of a single organization.

- **Hybrid cloud**

A hybrid cloud is a combination of two or more clouds (private, community, or public) but are bound together by standardized or proprietary technology that enables interoperability[3].

- **1.3 Service Models of Cloud**

- The service model supported by the cloud affect them just like different deployment models affect an organization's scope and control over the computational environment of a cloud. Three frequently-used service models are the following [11]:

- **Software-as-a-Service.** Software-as-a-Service (SaaS) is a model of software deployment for delivering software applications over the Internet, on demand and typically on a subscription basis. With SaaS, cloud providers host and manage the software application and underlying infrastructure and handle any maintenance, like software upgrades and security patching. Users connect to the application over the Internet, usually with a web browser on their phone, tablet or PC.
- **Platform-as-a-Service.** Platform-as-a-Service (PaaS) is a model of software deployment refers to cloud computing services that supply an on-demand environment for developing, testing, delivering and managing software applications. PaaS is designed to make it easier for developers to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network and databases needed for development.
- **Infrastructure-as-a-Service.** (IaaS) is a model Offering virtualized resources (computation, storage, and communication) on demand is known as Infrastructure as a Service (IaaS). A cloud infrastructure enables on-demand provisioning of servers running various options of operating systems and software stack as per needs. Infrastructure services are considered to be the bottom layer of cloud computing systems. Users are given privileges to perform numerous activities to the server, such as: starting and stopping it, customizing it. With IaaS, you charge infrastructure of IT, storage, networks, operating systems from a cloud provider on a pay-as-you-go-basis.

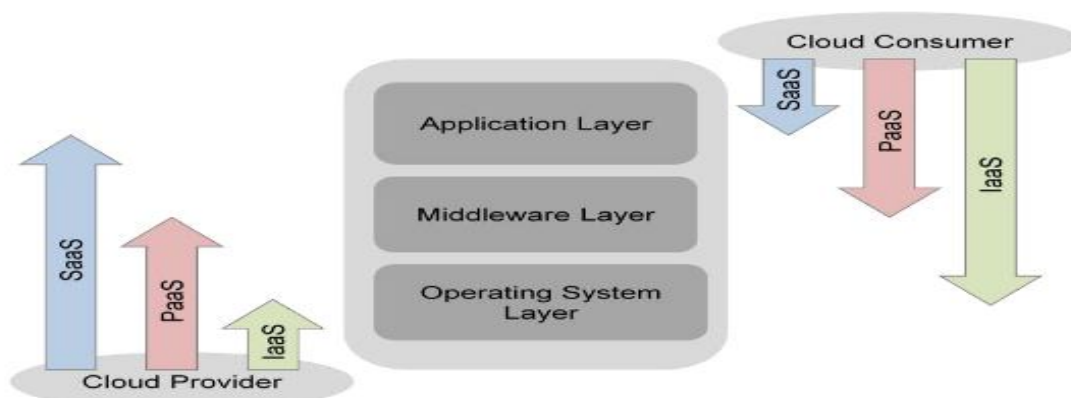


Figure1: Differences in Scope and Control among Cloud Service Model

While Cloud computing can be actualized for an association as a private inner cloud, its principle rationale has been to give re-appropriating parts of that condition to an outside gathering as an public cloud. Likewise with any outsourcing of data technology services, security and protection is concerned. The primary concern is on the risks related with exchanging imperative applications or information from the bounds of the organization data centre to that of third party association (i.e., public cloud), which is promptly available by the global public. Diminishing expense and expanding effectiveness are essential inspirations for moving towards public cloud, yet reducing duty regarding security ought not be. Eventually, the organization is responsible for the general security of the outsourced benefit. Observing and tending to security issues that emerge stay in the domain of the organization, as does oversight over other essential issues, for example, execution and accessibility. Since cloud computing accompanies new security challenges, it is obligation of an organization to check and oversee how the cloud provider secures and keeps up the registering condition and guarantees security of stored information.

2. ASPECTS OF CLOUD SECURITY

The words "Vulnerability," "Threat," "Risk," and "Exposure" regularly are utilized as equivalent words despite the fact that they have distinctive implications and connections to one another.

2.1 Vulnerability

It refers to a software, equipment, or procedural shortcoming that may give an attacker the open way to enter a computer or network and have unapproved access to assets within the environment. Vulnerability characterizes the absence or shortcoming of a safeguard that could be abused.

2.2. Exposure

It is an instance of being presented to misfortunes from a threat operator. Vulnerability opens an organization to conceivable harms. In the event that a bank does not appropriately fix its servers, it might be presented to conceivable ruptures in connection to the open holes coming about because of the missing patches. A countermeasure (likewise safeguard) is by and large established to relieve the potential risk. A countermeasure might be an arrangement, technique, a software configuration, or hardware device that dispenses with helplessness or lessens the probability that a risk specialist will have the capacity to misuse weakness. Solid authentication systems, computer antivirus software and data security awareness are a few precedents of legitimate countermeasures.

In any organisation, data security risks must be recognized, assessed, analyzed, treated and appropriately reported. Organizations that fail in recognizing the risks related with the technology they utilize, the people they employ, or the environment where they work typically subject their business to unexpected outcomes that may result in serious harm to the business. Vulnerability might be a service running on a server, unpatched applications or operating system software, or an unsecured physical entrance.

2.3 Threat

This is any potential risk to data or system. The Threat is that somebody, or something, will distinguish a particular vulnerability and utilize it against the organization or person. Threats misuse existing vulnerabilities trying to cause harm or destruct a resource. A "Threat Agent" is the element that exploits vulnerability. A threat agent could be an interloper, a procedure, or a worker committing an inadvertent error that could uncover secret data or demolish a record's trustworthiness.

2.4 Risk

Risk is the chance of a threat agent taking advantage of vulnerability and the corresponding enterprise effect. As an example, if users aren't educated on procedures and processes, there's a higher probability that a worker will make an intentional or unintentional mistake that could wreck information. Risk ties the vulnerability, threat, and chance of exploitation to the ensuing enterprise effect (see figure 2).

Due to the fact risks can not be absolutely removed, they want to be lowered into suitable levels. Perfect risks are risks that the business comes to a decision to live with, given that right evaluation for these risks become executed and the cost of treating these risks might outweigh the advantages [5]

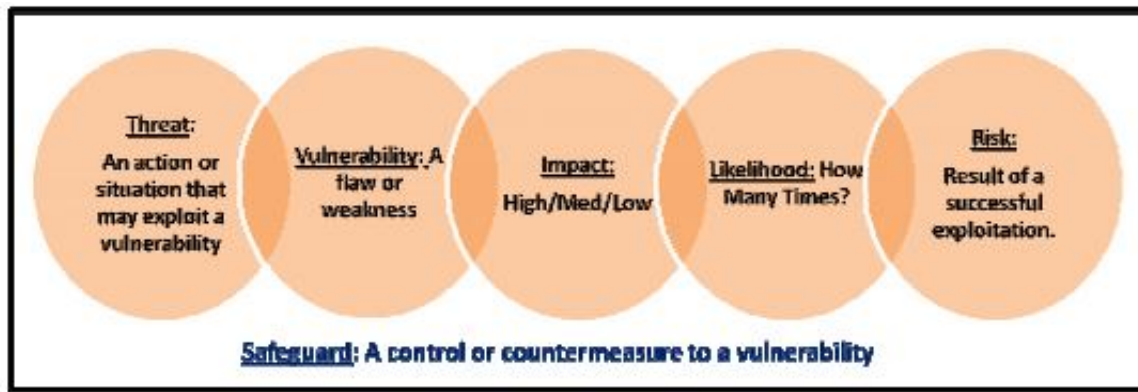


Figure-2: Risk=Vulnerability*Threat*Impact*Likelihood.

Cloud Computing leverages several present technologies along with web services, internet browsers, and virtualization, that contributes to the evolution of cloud environments. Therefore, any vulnerability associated to those technology boot affects the cloud, and it can actually have a signify cant impact. From Table1 presents an summary of threats in Cloud Computing. Like Table2 it additionally describes the threats that are associated with the technology employed in cloud environments, and it indicates what cloud service models are exposed to those threats. we have a tendency to put additional stress on threats that are related to information being stored and processed remotely, sharing resources and therefore the usage of virtualization.

Table-1: Threats in cloud computing

ID	Threats	Description	Layer
T01	Account or service hijacking	An account theft is performed by different ways like social engineering and weak credentials. If an attacker gains access to a user's documents, he will perform malicious activities like access sensitive knowledge, manipulate knowledge, and send any transaction.	SPI
T02	Data scavenging	Since data can't be fully removed from unless the device is destroyed, an attacker is also able to recover this knowledge.	SPI
T03	Data Leakage	Data leakage happens once the information gets into the unauthorized hands while it is being transferred, stored, audited or processed.	SPI
T04	Denial of Service	It is attainable that a malicious user can take all the attainable resources. Thus, the system cannot satisfy any request from alternative legitimate users because of resources being unavailable.	SPI
T05	Customer data manipulation	Users attack internet applications by manipulating knowledge sent from their application elements to the server's application. As aexample, SQL injection, command injection, insecure direct object references, and cross-site scripting.	S
T06	VM escape	It is designed to use the hypervisor so as to acquire control of the underlying infrastructure.	I
T07	VM Hopping	It happens once a VM is in position to achieve access to different VM (i.e. by exploiting some hypervisor vulnerability)	I
T08	Malicious VM Creations	An offender who produces a legitimate account will create a VM image containing malicious code like as a Trojan horse and store it within the supplier repository.	I
T09	Insecure VM migration	Live migration of virtual machines exposes the contents of the VM state files to the network. An attacker will do the subsequent actions: a) Access information illegally throughout migration b) Transfer a VM to associated untrusted host c) produce and migrate many VM inflicting disruptions or DoS	I
T10	Sniffing/Spoofing virtual networks	A malicious VM will hear the virtual network or perhaps use ARP spoofing to send packets from/to other VMs.	I

Table-2: Vulnerabilities in cloud computing

ID	Vulnerabilities	Description	Layer
V01	Insecure interfaces and APIs	Cloud suppliers provides services that may be accessed through APIs (SOAP, REST, or Hyper Text Transfer Protocol with XML/JSON). The security of the cloud depends upon the protection of those interfaces. Some issues are: a) Weak certification b) Short authorization checks c) Short input-data validation Also, clouds APIs are still immature which implies that are often updated. A fixed bug will introduce another security hole within the otherapplication.	SPI
V02	Unlimited allocation of resources	Inaccurate modeling of resource usage will cause to overbooking or over-provisioning.	SPI
V03	Data-related vulnerabilities	a) informationare often collocated with the information of unknown owners (competitors, or intruders) with a weak separation b) informationcould also besituatedcompletely numerous jurisdictions that have different laws c) Incomplete information deletion – informationcan't beutterly removed d) information backup done by untrusted third-party suppliers e) dataconcerningthe location of the information sometimes is not available or not disclosed to users f) informationis usuallystored, processed, and transferred in clear plain text	SPI
V04	Vulnerabilities in Virtual Machines	a) attainable convert channels within the allocation of VMs b) Unrestricted allocation and deallocation of resources with VMs c) Uncontrolled Migration - VMs may be migrated from one server to a different server because of faulttolerance, load balance, or hardware maintenance d) Uncontrolled snapshots – VMs may bederivedso asto produce flexibility, which cancauseinformationleakage. e) Uncontrolled rollback may lead to reset vulnerabilities - VMs may beinsured to a previous state forrestoration, however patches applied once the previous state disappear f) VMs consistsIPaddresses that are visible to anyone inside the cloud - attackers will map wherever the target VM is foundinside the cloud (Cloud cartography)	I
V05	Vulnerabilitiesin Virtual Machineimages	a) Uncontrolled placement of VM images public repositories b) VM images aren't able to be patched since they're dormant artifacts	I
V06	Vulnerabilities in Hypervisors	a) Advanced hypervisor code b) Versatile configuration of VMs or hypervisors to satisfy organization desire is exploited	I
V07	Vulnerabilities in Virtual Networks	Sharing of virtual bridges by many virtual machines	I

Table 2, We will conclude that information storage associate degree virtualization are itthe foremostcrucial and an attack to them can do the foremost harm. Attacks to lower layer have additional impact to the different layers[12][13].

CLOUD SECURITY ISSUES

Cloud storage needs are durable due to availability and security factors. Security problemsare increasing with the rise in cloud service usage [6].Authorization and authentication plays the foremost role for security. Authentication is that the method of secure the information for user's data protection. Access control plays the

foremost role for information privacy [1]. It is often accustomed distinguish the privileges, for accessing the information resided in Cloud. Cloud storage was classified into three categories likes object storage, file storage and block storage. Table 3, thoroughly tabularizes the recent analysis work done on the security problems in Cloud Computing with advantages and Disadvantages.

Table-3: A Survey On Cloud Security Issues

S. No.	Year	Author	Proposed Algorithm	Pros	Cons
1	2017	Noelle Rakotondra a vony et.al.,[9]	VMI-based Mechanism's.	Invention of target & direction of attacks, providing the applied mathematics of the report.	Briefs the problems and lack on solutions.
2	2017	Rongzhi wang et.al.,[13]	Data Secure Storage based on Tornado Codes (DSBT).	Solve the matter of data change of state	It brings series of negative issues, information security problems detection & retrieve within the information availability.
3	2018	Mylara Reddy Chinnaiiah et.al.,[14]	Fault Tolerant Technique IFrFT(Frequency of Configuration interactions), ChIFrFT(Characteristics & Frequency if interactions).	It achieves responsibility & fault tolerance of a software packages in a cost efficiency and it's better than NOFT Scheme.	%age of successful interactions is low(25 & 40%).
4	2018	J.Mahalakshmi and K.Kuppusamy [15]	Security-As-A – Service for files in Cloud Computing	An application model is developed that encrypts sensitive data and works well against cryptanalytic attacks.	Key size is restricted and limited parameters are verified.
5	2015	Primož cigoj et.al.,[16]	SSO(Single Sign On) Approach	Unified access point of a management in cloud and a secure strong Authentication.	It tries to remove some vulnerability only. It requires more flexible, secure interfaces, control of the user data & privacy and not focusing in the technology development.
6	2014	Younis A.Younis et.al.,[12]	Novel Access Control Model.	Access necessities is dynamic, easy to handle and it is better than MAC and RBAC.	It is to perform high time & large space complexity is found.
7	2013	Jun Hu et.al.,[11]	MAC Access Control Mechanism	Provides the necessary technical & management strategies, Security of information accessing with new Access control mechanism end in controlled accessing of data by authorized users.	Security protocol has become the key problems.
8	2011	S.C.Wang et.al.,[10]	Group Key Authentication protocol(GKA)	Concentrates on Authentication time. By this approach data traffic is wide reduced and Quality of Service raised.	Even though the QoS raised the Method relies poor scalability, an vital part of Cloud Computing.

CLOUD DATA SECURITY ALGORITHMS

Cryptography is outlined because the science and study of remodeling message to create them secure and resistant to attacks by unauthorized user or it's the science and art of "secret writing" shown in figure 3. The original data/message, before being transformed is named as cipher text.

The method to transform the plaintext into cipher text is understood as encryption and therefore the process to retransform the cipher text into plaintext is understood as decryption.

The sender uses encryption algorithm and therefore the receiver uses a decryption algorithm. Thus, encryption and decryption facilitate to secure transmission of the message and defend the message from unauthorized users [1].

There are three forms of cryptography algorithm that are given below [2] [7]:

- Symmetric key cryptography algorithm
- Asymmetric key cryptography algorithm
- Hashing cryptography

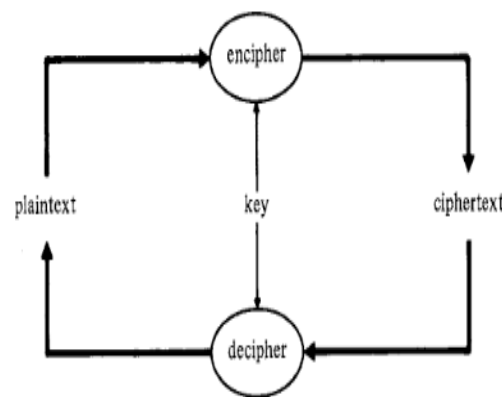


Figure-3: Secret Writing

4.1 Symmetric (Secret) Key Cryptography

This Symmetric cryptographic method uses two totally different algorithms for encryption and decryption respectively, and same one key is utilized by each the sender and therefore the receiver. The sender uses this key and an encryption algorithm to code information, also the receiver uses the same key and the corresponding decryption algorithm to decrypt that data [8].

The description of some frequently used Symmetric key cryptographic algorithms are given below:

AES (Advanced Encryption Standard) could be a symmetric block encryption standard suggested by NIST [3] [5] is employed for securing data with the utilization of same key for each encryption and decryption. It has variable key length of 128, 192, or 256 bits; default 256. It encrypts data blocks of 128 bits in 10, 12 and 14 round depending on the key size. [4] [7] [10] [11].

DES (Data Encryption Standard) is a symmetric block encryption standard to be suggested by NIST [3]. The DES algorithm is the most comprehensively utilized encryption algorithm on the planet. A similar algorithm and key are utilized for encryption and decryption, with minor contrasts. DES acknowledges a input of 64-bit long plaintext and 56-bit key (8 bits of parity) and create output of 64 bit block [1] [2].

3DES Triple Data Encryption Algorithm (TDEA or Triple DEA) is a symmetric-key block cipher standard which is like DES strategy yet increment encryption level 3 times than DES [6]. Accordingly this is slower than other block cipher strategies. The block size of 3DES is 64 bit with 192 bits key size [7].

BLOWFISH Blowfish is a symmetric key cryptographic algorithm that encodes 64 bit blocks with a variable length key of 128-448 bits. Blowfish is the superior than other algorithms in throughput and power utilization [8] [2].

RC4 The RC4 (Rivest Cipher 4) is an encryption algorithm that is a common key stream cipher algorithm requiring a safe exchange of a mutual key [9] [5] [6]. The RC4 encryption algorithm is utilized by norms or standards such as IEEE 802.11 inside WEP (Wireless Encryption Protocol) utilizing 40 and 128-bit keys. To produce the key stream, the cipher makes utilization of a secret internal state which comprises of two parts:

1. A permutation of all 256 possible bytes (denoted "S" below).
2. Two 8-bit index-pointers (denoted "i" and "j").

The permutation is introduced with a variable length key, regularly somewhere in the range of 40 and 256 bits, utilizing the key-scheduling algorithm (KSA).

4.2 Asymmetric (public) Key Cryptography

This cryptographic strategy makes utilization of two separate keys for encryption and decryption individually, an public key for encryption and a private key for decryption. The public key of the sender is utilized to encrypt the message by the sender. The receiver decrypts the cipher text with the assistance of a private key. A portion of the generally utilized Asymmetric key cryptographic algorithms are given below:

RSA (Rivest-Shamir-Adleman) is extensively utilized an asymmetric encryption/ decryption algorithm which includes an public key and a private key. The public key can be told to everybody and is utilized for encrypting messages. Messages encrypted with public key must be decrypted utilizing the private key. It secured client information assimilate encryption before to capacity, client transmission [4] [9] [3] [2]. 4096 bit key size is utilized for execution of RSA algorithm. RSA algorithm involves these steps: 1. Key Generation 2. Encryption 3. Decryption

DIFFIE-HELLMAN The scheme was first uncovered by Whitfield Diffie and Martin Hellman in 1976. Diffie–Hellman key trade is a particular technique for exchanging cryptographic keys [6]. It grants two parties that have no earlier knowledge of one another to mutually make a common mystery key over an insecure communications channel. This key would then be able to be utilized to encrypt posterior communications utilizing a symmetric key cipher.

PAILLIER The Paillier cryptosystem is an asymmetric algorithm given by Pascal in 1999. It has homomorphic property **allows** this scheme to do **typical expansion tasks** on **few** encrypted values and achieving the encrypted sum, the encrypted sum can be decrypted later without knowing the values ever that made up the sum.[3]

4.3 Hashing Cryptography

Hash functions are a major elementary in the field of cryptography, utilized generally in a wide range of critical applications including: message integrity and authentication [15] [16], digital signatures [1], secure time stamping, and countless others. A hash function H is an efficiently-computable algorithm that takes as input an arbitrary-length message M and potentially a fixed-length key K (considering a keyed hash function), and makes a fixed-length output D called the message digest. $H(K, M) = D$ Here, D = Message Output, K = Fixed Key Length, M = Input Message Length. The description of some widely used Hashing cryptography algorithms are given below:

MD5 (Message Digest5) is an extensively utilized cryptographic hash function with a 128-bit hash value. It forms a variable-size message into a fixed-length output of 128 bits [3]. The information message is isolated into chunks of 512-bit blocks; at that point the message is cushioned for making its length divisible by 512[4]. In this sender utilize the public key of the receiver to encrypt the message and receiver utilize its private key to decrypt the message.

MD6 The MD6 Message-Digest Algorithm is a cryptographic hash function. MD6 makes utilization of a substantially unique tree-based mode of task that takes into account more parallelism [8]. MD6 might be seen as a tree-like construction, with a 4-to-1 compression function diminishing the general length of the message at each level [2].

SHA (Secure Hashing Algorithm) is a hashing algorithm. SHA-1 is most widely utilized SHA hash function, yet rapidly it will be supplanted by more current and more stronger SHA-2 hash function. It is as of now utilized in a wide variety of applications, including TLS, SSL, SSH and PGP. SHA1 outputs a 160-bit digest of any sized file or input. SHA-256 algorithm produces an almost-unique, fixed size 256-bit (32-byte) hash [6]. This makes it appropriate for password validation, challenge hash authentication, anti-tamper, digital signatures. SHA-256 is one of the successor hash functions to SHA-1, and is one of the strongest hash functions available. SHA-256 hash functions computed with 32-bit words.

Table-4: Characteristics of Cryptography Algorithms

Scheme	Algorithm Type	Contributor	Key Length	Rounds	Block Size
AES	Symmetric	Rijindael	128,192, 256	10 or 12 or 14	128 bits
DES	Symmetric	IBM 75	56-bits	16	64 bits

3DES	Symmetric	IBM 78	168, 112 bits	48	64 bits
BLOWFISH	Symmetric	Bruce Schneier 93	128-448 bits	-	64 bits
RC4	Symmetric	Ronald Rivest 87	40-128-bits	-	-
RSA	Asymmetric	Rivest, Shamir, Adleman 77	1024	1	Minimum 512 bits
DSA	Asymmetric	NIST 91	-	-	-
Diffie-Hellman	Asymmetric	Diffie, Hellman 76	-	-	-
EI-Gamal	Asymmetric	Elgamal 84	-	-	-
Paillier	Asymmetric	Paillier 99	-	-	-
MD5	Hashing	Rivest 91	128	-	512 bit
MD6	Hashing	Prof. Rivest 08	-	-	-
SHA	Hashing	NIST 95	160	-	-
SHA256	Hashing	-	256	-	32 bit

In the table 4 demonstrates a relative summary between AES, DES, 3DES, BLOWFISH, RC4, RSA, DSA, Diffie-Hellman, EI-Gamal, Paillier, MD5, MD6, SHA and SHA256 is displayed in to five components which are Algorithms, Contributor, Key Length, Rounds and Block Size. The key sizes of the considerable number of calculations are not the same as one another. The key length of DES algorithm is 56 bits. The key size of AES algorithm is 128, 192, 256 bits. The key size of Blowfish algorithm is 128-448 bits. The key size of RSA algorithm is 1024 bits.

CONCLUSION

Cloud Computing is a moderately new idea that displays a decent number of advantages for its users; in any case, it likewise raises some security issues. As Cloud Computing holds numerous advancements, it likewise acquires their security issues. Security issues for cloud models: IaaS, PaaS, and SaaS, which vary depending on the model. Storage, virtualization, and networks are the greatest security worries in Cloud Computing.

In this paper, We have centered to separate vulnerabilities and threats, where we think about vital to comprehend these issues. We made a connection among threats and vulnerabilities, so we can recognize what vulnerabilities add to the execution of these threats and make the framework more robust. We additionally talked about some current security algorithms with the end goal to relieve these security issues. New security algorithms are required and additionally there is requirement to redesign traditional solutions that can work with cloud architectures.

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PERFORMANCE ENHANCEMENT OF OPTICAL COMMUNICATION SYSTEM USING OPTIMUM LENGTH OF DCF

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ABSTRACT

Optical communication system gained significant importance from the last decade because of its high bandwidth transmission capabilities. However, dispersion limits the performance of the system by reducing its bandwidth and increasing the BER. The effect of dispersion may be reduced by dispersion compensation fiber (DCF). In this paper, an optical communication system is designed using a single mode fiber and its performance is evaluated using DCF at different distances. An optimum length of DCF is calculated for 5, 10, 15 and 20 Km ranges. It improves the transmission capacity of the system by reducing the nonlinearities of fiber. The simulative investigation is done in terms of Q factor, power, noise and eye diagram.

Keywords: Optical communication system, DCF, BER, Q factor, Dispersion, Transmission capacity

INTRODUCTION

A communication system uses electromagnetic waves for data transmission from one point to another. Fiber optic communication is a light wave system that uses optical fiber for data transmission and that has revolutionized the telecommunication. This communication system consists of three sections: an optical transmitter, optical receiver and a communication channel (optical fiber). A channel is used to transmit the output (optical signal) from the transmitter to the receiver section by keeping the signal distortion-free. So, fiber losses are the main factors in consideration for designing of the fiber [1-3]. However, the fiber losses which degrades the optical communication systems capability is solved by the emergence of optical amplifiers. However, there are a number of factors that affect the performance of fiber but the main one is dispersion that occurs when signals in the fiber spread while propagating. In optical communication, each optical pulse is allocated a specific bit slot. However, if these pulses spread they cause intersymbol interference that result in degradation of the transmitted signal. So, the recovery of the accurate transmitted signal becomes difficult. Dispersive and nonlinear effects rather than fiber losses often limit the current light wave systems [4-5]. Optical amplifier solves the loss problem but worsens the dispersion problem. So, dispersion management techniques can be used to enhance the transmission capacity of the channel. A method that is utilized to compensate dispersion is dispersion compensation fiber (DCF). An all-optical technique completely overcomes the dispersion when non-linear effects are negligible inside the fiber [6].

In this paper, an optical communication system is designed and investigated using DCF at different ranges. An optimum length of DCF is calculated for different ranges that improves the transmission capacity of the system by reducing the nonlinearities of fiber.

DISPERSION COMPENSATING FIBER (DCF)

Dispersion limits the system's performance by reducing its bandwidth and increasing the BER. In order to reduce the effects of dispersion, DCF is used in an optical communication system. DCF is a single mode fiber with small core diameter. It has a large negative chromatic dispersion value also called group velocity dispersion. By joining fibers with opposite sign chromatic dispersion (negative) and suitable length, an average dispersion close to zero is obtained [7]. The length of DCF can be several kilometres and can be placed at any point in the link.

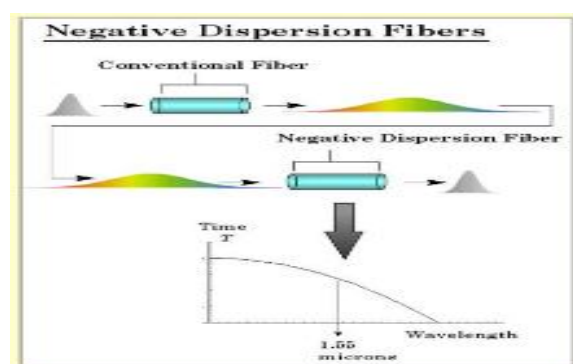


Fig-1: Concept of DCF [7]

SYSTEM DESCRIPTION

Figure 2 exhibits the simulation setup of the proposed system. The optisystem software is used for the investigation of the optical communication system having 2.5 Gb/s bit rate for variable DCF.

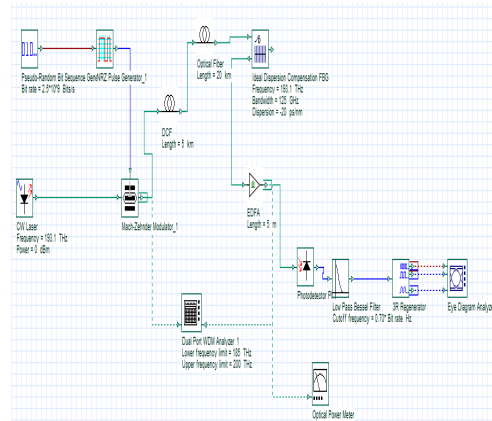


Fig-2: Simulation setup of proposed optical communication system using DCF.

The setup comprises of three sections: transmitter, channel and receiver. In transmitter section, we have a laser whose frequency is set as 193.1 THz and its power is at 0dbm. The Pseudo Random Binary Sequence (PRBS) generates data based on diverse operating modes, a Non-Return to Zero (NRZ) generate NRZ coded signal, and finally, the signal is digitally modulated by the user data using Mach-Zehnder (MZ) modulator. The signal from the transmitter output is then transmitted into the channel that contains DCF, optical fiber and FBG[8]. At the receiver, the optical output from the channel is converted into electrical signal by photodiode. Thereafter, signal is processed into low pass filter (LPF) followed by 3R regenerator and eye diagram[9][10]. In this way, the signal is recovered. Simulation parameters [1][5] used in the system are given in Table 1.

Table-1: Parameter used in the simulation

Parameters	SMF	DCF
Reference wavelength	1550nm	1550nm
Length	Variable	Variable
Attenuation	0.25db/ km	0.6db/Km
Dispersion	17.5ps/(nm.km)	-80 ps/(nm.km)
Dispersion slope	0.08 ps/nm ² /km	0.08 ps/nm ² /km
Differential group delay	3ps/km	3ps/km

RESULTS AND DISCUSSION

In order to find out the optimum length of DCF for disparate ranges (5, 10, 15 and 20 km), we simulate the proposed optical communication at different DCF length (0, 1, 2, 3, 4 and 5). Figure 3, shows the graph between DCF length and Q factor at different ranges. From the graph, it is clear that optimum value, the value that enhances the system, is different at different ranges. For 5 km, we get peak if we use DCF of length 1 km. At 1 km, the Q factor achieved is 407. Above and below 1 km, the Q factor decreases. Similarly, for 10, 15 and 20 km, the peak value of DCF is achieved at 2, 3 and 4 km respectively that shows the system's capability is better only at the optimum length of DCF.

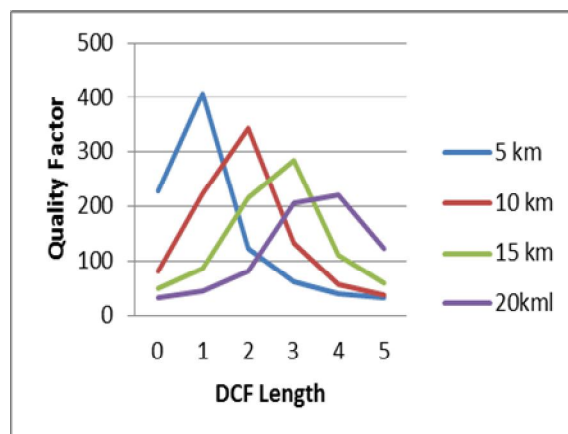


Fig-3: DCF length versus Quality factor at different ranges.

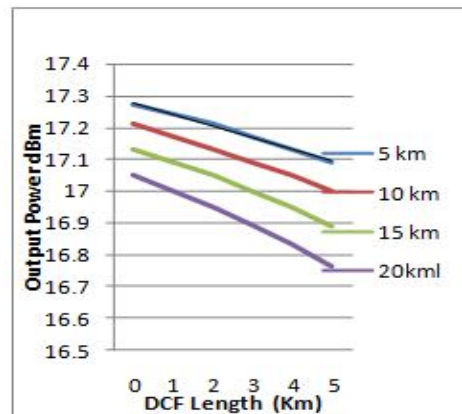


Fig-4: DCF length versus output power at different ranges.

Figure 4. shows the graph between DCF length and the output power received. The results indicate that as the length of the DCF increases the power received at the output decreases. The result shown in Figure 5 justifies that noise power increases as the DCF length increases. But, with the increase in fiber length the gain is decreases.

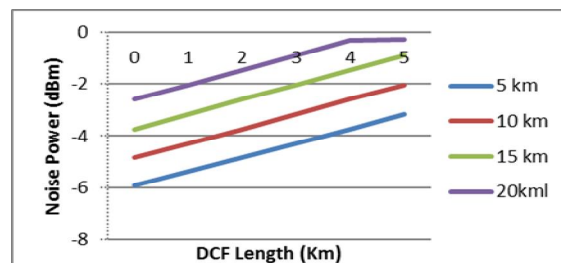


Fig-5: DCF length versus noise power at different ranges

Table-2: Results received at 10 km fiber length

Length of DCF	Q factor	Output Power (dbm)	Noise Power (dbm)
0	82	17.21	-4.84
1	223	17.17	-4.29
2	344	17.13	-3.73
3	133	17.09	-3.17
4	57	17.05	-2.6
5	38	17	-2.03

Table 2 indicates the results of Qfactor, output power and noise power at 10km for a different length of DCF fiber. The results show that our system performs well in comparison to other systems in terms of Q factor, output power and noise power [5]. Figures 5,6,7 and 8 shows the eye diagrams at 5,10,15, and 20 Km fiber length at 0,1,2,3,4, and 5km DCF length. From the eye diagram, it is clear that increase in the DCF length does not enhance the system's performance rather system performs better only at an optimum value.

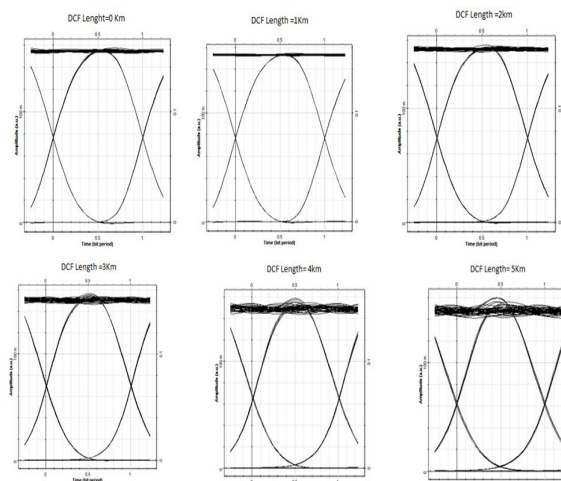


Fig-5: Eye diagram at 5KM

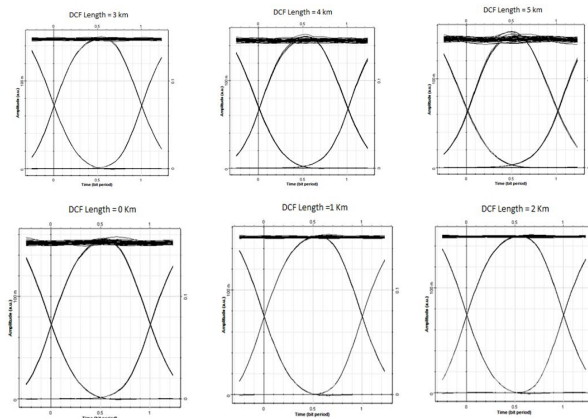


Fig-6: Eye diagram at 10 Km

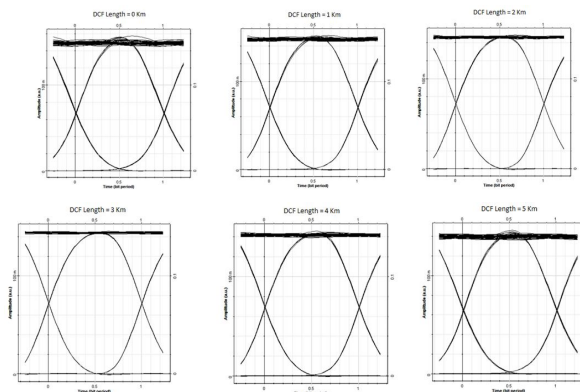


Fig-7: Eye diagram at 15 km

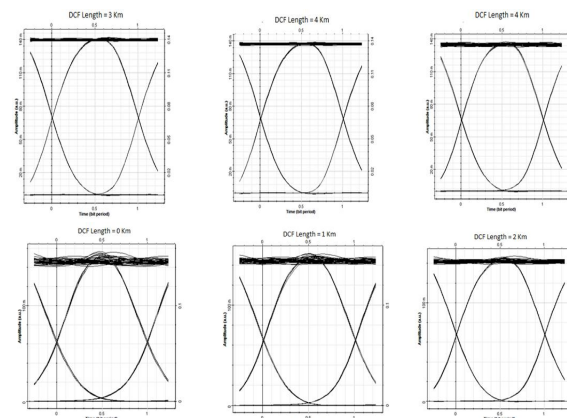


Fig-8: Eye diagrams at 20 km

CONCLUSION

In this paper, the designing and analysis of an optical communication system is carried out which has 2.5 Gb/s bit rate. The system is investigated using different values of DCF (0, 1, 2, 3, 4 and 5 Km) for 5, 10, 15 and 20 km ranges. An optimum length of DCF is calculated for different ranges which improves the transmission capacity of the system by reducing the nonlinearities of fiber. Results indicate that if single mode fiber of 5 km length is used, the optimum value of DCF is achieved at 1 Km with Q factor of 407. Similarly, for 10, 15 and 20 Km the peak value of DCF is achieved at 2, 3 and 4 Km respectively.

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EFFECT OF TITANIUM POWDER MIXED ELECTRICAL DISCHARGE MACHINING ON MATERIAL REMOVAL RATE (MRR) OF AISI P20 STEEL

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ABSTRACT

AISI P20 steel is widely used for tooling purposes for injection molding industries. In present work, experimental investigation on electrical discharge machining of AISI P20 steel has been carried out to investigate the material removal rate (MRR). Orthogonal array (OA) technique is used to vary various input parameters i.e. (polarity, peak current, pulse on time, gap voltage and concentration of abrasives). Percentage contribution of electrical discharge machining variables has been identified by using analysis of variance (ANOVA) technique. Experimental results are presented to show the effect of variables on material removal rate (MRR) of AISI P20 steel:

Keywords: Electrical Discharge Machining, AISI P20 Steel, Material Removal Rate (MRR)

INTRODUCTION

Welcome In last five decades, technology of EDM has played an essential role in manufacturing industries and became crucial in manufacturing applications such as die and mold making, micro-machining, machining of composite ceramics and prototyping etc. The phenomena of electrical discharge or spark machining in EDM process takes place over a very short period of time in the gap between electrode and work piece, which is filled with dielectric liquid involving melting and evaporation of the tool electrode as well as work piece material. However, an EDM gap phenomenon is very complex and hence not yet fully understood. Earlier in 1770, Joseph Priestly an English scientist discovered the erosive effect of electrical discharges. In 1943, soviet scientists B. R. Lazarenko and N. I. Lazarenko reversed the effect of metal removal from electric circuit breakers and optimized this phenomenon for material removal purposes. The mechanism of erosion of material from work piece mainly conversion of electrical energy into thermal energy through a series of sparks occurring into inter electrode gap between tool electrode and the work piece. Powders in the dielectric fluid enlarge the gap between the work piece and electrode and improve the surface finish by reducing the spark energy and dispersing the discharges more uniformly throughout the surface of work piece to be machined [1]. M. L. Jeswani [2] is noted 60% improvement in MRR and 15% reduction in electrode wear ratio when 4 g/l graphite powder was added in dielectric fluid (kerosene oil) of EDM process. Y. S. Wong et al. [3] noted that appropriate settings of electrode polarity and Pulse parameters and the correct combination of work piece material and powder characteristics have a significant influence on the mirror-finish condition. The negative electrode polarity is necessary to achieve the mirror-finish surface. B. H. Yan et al. [4] Noted that peak currents of EDM-drilling and volume fraction of Al₂O₃ were confirmed to have significant affects on the material removal rate (MRR), electrode wear rate and surface roughness. In comparison, the flushing pressure and electrode rotation speed have minor affects on the MRR, electrode wear rate and surface roughness. Y. Chen et al. [5] noted that the current value and the ratio of the pulse duration and the pulse interval exert the greatest influence on surface quality. It was also concluded that to achieve the desired surface finish, a multi-stage erosion machining process is advisable. However, a relatively large gap voltage is more suitable to achieve a super- fine surface finish. W. S. Zhao et al. [6] Experimentally observes that PMEDM makes loss of discharge energy in the gap leads to reduction in melting the material so machining efficiency becomes lower and so the surface roughness becomes smaller as compared with conventional process of EDM. P. Singh et al. [7] investigated the effect of Al powder mixed in the dielectric fluid of during EDM of hastelloy using copper electrode tool. Author used process input parameters e: g (concentrations of Al powder and grain size of powder). MRR, TWR, %age wear rate, surface roughness was taken as output parameters to measure process performance. Results concluded that both the input parameters strongly affect the machining performance of hastelloy. The addition of aluminum powder in dielectric fluid increases MRR decreases TWR and improves surface finish of hastelloy. Singh et al. [8] investigated effect of electrical parameters on the performance of EDM of hastelloy using copper tool electrode. Author used process machining parameters e: g (Peak current, gap voltage, pulses on time and duty cycle). MRR, TWR, % wear ratio and surface roughness are taken as response parameters to measure process performance. Results indicated that all the input machining parameters strongly affect the machining performance of hastelloy.

EXPERIMENTAL PROCEDURE

A. Equipment and work-piece material used

A number of experiments runs were conducted on ZNC (OSCARMAX-S645 CNC EDM Machine) shown in figure no. 1. Dimensions of dielectric tank (LxWxH: 1500mm x 940mm x 520mm) with a capacity of 1200 liters. The work-piece material was used for experimentations i.e. AISI P20 steel having size of 40x40x10 mm and tool electrode material i.e. copper having diameter of 9.5 mm. physical and mechanical properties of copper i.e. density 8.96g/cm³, thermal expansion at 25°C $\mu\text{m/m/K}$, electrical resistivity at 20°C 16.78n. $\Omega\text{-m}$, tensile strength 90MPa, thermal conductivity 401W/m/K. The surface of work-piece material i.e. AISI P20 steel was machined on lathe machine and finishing was done on grinding machine. Tool electrode material i.e. copper was first faced on lathe machine and then fixed on fixture of EDM machine for experimentation. The properties of titanium abrasive are: dark grey color, density 9.3g/m³, electrical resistivity at 20°C 420n. $\Omega\text{-m}$, thermal conductivity 21.9W/m/K. A steel tank of mild steel material having capacity of 8 liters was made in workshop to carry out the abrasive mixed experiments. The steel tank was filled with 6 liters dielectric and placed on the bed of EDM machine at proper place. Titanium abrasives size having 100mesh with measured quantity was mixed in dielectric tank for experimentation work as per Orthogonal Array plan.

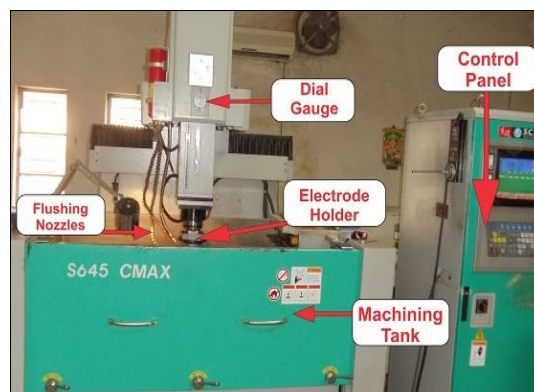


Fig.1 OSCARMAX-S645 CNC EDM Machine

Table-1: Properties and Composition of AISI P20 Steel

Work Piece (P20 Steel)	AISI P20
Hardness (HRC)	48
Density (g/cm ³)	7.85
Elastic modulus (GPa)	207
Yield tensile strength (MPa)	827-862
Ultimate tensile strength (MPa)	965-1030
Compressive strength (MPa)	862
Thermal conductivity (W/m/K)	41.5
Poisson ratio	0.28
C(%)=0.40, Mn(%)=1.00, Si(%)=0.40, P(%)=0.03, Mo(%)=0.35, Cr(%)=12.0, Co(%)=0.25, S(%)=0.03	

B. Experimental Design

Table 2 depicts the various conditions of experiments used in the abrasive electrical discharge machining of AISI P20 steel. Five EDM input machining variables were selected i.e. (tool electrode polarity, peak current, pulse on time, gap voltage, and abrasive concentration in EDM dielectric fluid). All the variables are varied at three levels except polarity which varied at only two possible levels namely positive and negative. Table 3 depicts values of these variables; their symbols used and selected range.

Table-2: Setup of experiments and operating conditions

Condition	Description
Work piece	AISI P20 mold steel
Tool electrode material	Copper
Tool electrode diameter	9.5mm (solid rod)
Dielectric fluid	EDM oil
Grain size of abrasives	100 mesh
Polarity	+ve and -ve
Peak current	6-12

Pulse on time	120-200
Gap voltage	40-80
Abrasive concentration	0-12

Table-3: Design scheme of machining variables

Symbol	Control Variables	Level 1	Level 2	Level 3
A	Polarity	+ve	-ve	-
B (amp)	Peak current	6	9	12
C (μs)	Pulse on time	120	150	200
D (volt)	Gap voltage	40	60	80
E (g/l)	Abrasive concentration	0	6	12

According to Taguchi methodology, the effect of different input machining variables on the performance characteristic in a condensed set of experiments can be examined by using the orthogonal array (OA). Orthogonal arrays of Taguchi design makes it possible to carry out fractional factorial experiments in order to avoid numerous experimental works as well as to provide shortcuts for optimizing input variables. In the present work, L18 orthogonal array is selected in which one variable varied at two levels and four variables varied at three levels. This orthogonal array has 5 columns and 18 rows. The experiments are performed as per this orthogonal array and results are noted down for surface roughness values of bottom of machined blind holes. Table 4 shows the variation of input variables as per selected orthogonal matrix.

A. Orthogonal Array (OA)

In the Taguchi methodology, the S/N ratio is used to find the deviation of the performance characteristic from its desired value. Usually, there are three kinds of the performance characteristics in the analysis of the S/N ratio, i.e., (a) lower-the-better, (b) higher-the-better, and (c) nominal-the-better. In machining operations the lower the surface roughness is always desirable. So, the lower-the-better surface roughness is selected. For lower-the-better category the signal-to-noise ratio for the i th performance characteristic in the j th experiment at the k th test can be expressed as:

Where 'n' is the number of tests

$$(S/N)_{ij} = -10 \cdot \log_{10} \left\{ \frac{1}{n} \sum_{k=1}^n y_{ijk}^2 \right\}$$

Exp. No.	Coded Variable Levels				
	(A)	(B)	(C)	(D)	(E)
1	1	1	1	1	1
2	1	1	2	2	2
3	1	1	3	3	3
4	1	2	1	1	2
5	1	2	2	2	3
6	1	2	3	3	1
7	1	3	1	2	1
8	1	3	2	3	2
9	1	3	3	1	3
10	2	1	1	1	3
11	2	1	2	2	1
12	2	1	3	2	2
13	2	2	1	2	3
14	2	2	2	3	1
15	2	2	3	1	2
16	2	3	1	3	2
17	2	3	2	1	3
18	2	3	3	2	1

B. Orthogonal Array (OA)

Significance of input machining variables as well as their contribution to affect output response characteristic is tabulated using analysis of variance technique. Range of variation of signal to noise ratio of input variables are calculated as delta values in response table.

II.RESULTS ANALYSIS AND DISCUSSION (FOR LARGER IS BETTER)

Taguchi method is used to analyze the result of MRR for larger is better criteria. The analysis of variance for Means for MRR (larger is better) is shown in Table no. 5. Response for means for MRR (Larger is better) are shown in table 6. From the delta values and the rank assigned to various input parameters and by considering the case “MRR: larger is better”, it is clear that Polarity is the most significant factor and Gap Voltage is the least influencing factor.

Table-5: Analysis of Variance for Means for MRR (Larger is Better)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Polarity (A)	1	0.046269	0.046269	0.046269	70.88	0.000
Peak Current (B)	2	0.001927	0.001927	0.000963	1.48	0.285
Pulse on Time (C)	2	0.003017	0.003017	0.001508	2.31	0.161
Gap Voltage (D)	2	0.001836	0.001836	0.000918	1.41	0.300
Concentration of Abrasives (E)	2	0.001851	0.001851	0.000925	1.42	0.297
Residual Error	8	0.005222	0.005222	0.000653	-	-
Total	17	0.060121	-	-	-	-

Table-6: Response Table for Means for MRR (Larger is Better)

Level	Polarity (A)	Peak Current (B)	Pulse on Time (C)	Gap Voltage (D)	Concentration of Abrasives (E)
1	0.005575	0.049456	0.050514	0.059319	0.048976
2	0.106975	0.048474	0.044105	0.042668	0.049234
3	-	0.070895	0.074206	0.066838	0.070614
Delta	0.101400	0.022421	0.030101	0.024171	0.021638
Rank	1	4	2	3	5

ANOVA tables are used to summarize the experimental results. The table concludes information of analysis of variance and case statistics for further interpretation. After the ANOVA procedure, further analysis was performed in graphic plots. The scatter plots of output response parameters are drawn to observe their variation against input machining parameters. MRR is analyzed for larger is the better criteria. Main effects plot for means of MRR are shown in Figure no. 2.

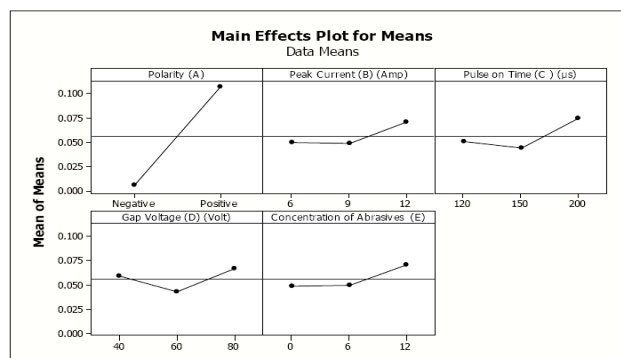


Fig-2: Main effects plot for means (MRR)

From figure no.2 it is clear that MRR is more for positive polarity as compare to MRR obtained using negative polarity. In positive polarity small mass electrons with high velocity strike the work-piece with heavy momentum and with high energy which causes more erosion. But in the negative polarity, heavy mass ions flow towards the work-piece and strike it with less momentum which erodes less material from work-piece and hence less is the MRR. MRR increases with increase in peak current. An increase in peak current produces strong spark, which produces the higher temperature, causing more material to melt and erode from the work piece. It is well known fact that the spark energy increases with pulse on time. It has been observed that material erosion rate slightly decrease as the value of pulse on time increases from 120μs to 150μs.

It is perhaps due to the reason that plasma formed at high pulse on time hinders the energy transfer in the inter electrode gap and hence decreased the erosion rate of the work piece material. But further increase in pulse on time above 150 μ s to 200 μ s, higher spark energy in the inter electrode gap obtained at high pulse on time is responsible for increasing the material erosion rate. MRR decreases slightly when the gap voltage increases from 40V to 60V because discharge gap increases with an increase in voltage. Flushing efficiency is reduced at high voltages which lead to a reduction in MRR. After 60V, the MRR increase sharply with increase in potential application up to 80V.

The reason is strong potential applied across the mating surfaces overcomes the earlier reduced flushing efficiency effect. With the addition of abrasives into the dielectric fluid, MRR increases significantly. Addition of abrasives in the dielectric fluid enlarges and widens the spark gap size. Due to this the discharge occurs early in the spark gap. Increased frequency of 59 discharges per pulse causes more erosion of material from work surface and hence MRR increases. The criterion of MRR (Larger is Better) is satisfied by different input machining parameters as per their levels shown in table 7.

Table-7: Values of input parameters at maximum MRR

Factor	A	B	C	D	E
Values	+ ve	12	200	80	12

CONCLUSION

After conducting the detailed experimental investigations and analyzing the results obtained through Analysis of Variance approach, following conclusions regarding the effect of input factors (polarity, peak current, and pulse on time, gap voltage and concentration of abrasives in EDM oil) with respect to output parameter e.g. Material Removal Rate (MRR) can be made. Work surface erosion is large when machining setup is at positive polarity as compare to work surface erosion obtained when machining setup is at negative polarity. Electrode surface erosion is smaller when machining setup is at negative polarity as compare to electrode surface erosion when machining setup is at positive polarity. When machining setup is at positive polarity the light mass electrons with high speed flow and strike the work-surface with greater momentum and with greater striking energy which causes more erosion. But when machining setup is at negative polarity, heavy mass ions flow towards the work-piece and strike it with lower momentum which erodes less work surface material and hence less is the MRR. So WR when machining setup is at positive polarity is less than the WR when machining setup is at negative polarity. This is due to the reason of more MRR at positive polarity and lesser at the negative polarity.

FUTURE SCOPE

In the present experimental findings, it has been documented that the all the selected input machining factors/parameters affect the output responses in certain ways. This creates a lot of scope for the future work. Some of these fields may be documented below.

1. In EDM setup the work surface erosion occurs as powerful sparking across the mating surfaces of tool and work piece creates very high temperature. However circulating dielectric fluid cools down the work piece and tool surfaces at much rate. This causes temperature variation during one complete cycle of sparking. This variation in the temperature in one complete cycle can be measured and analyzed.
2. In the last decade, a process of making electrodes through compacting and sintering process known as Powder metallurgy technique is emerged as new useful technique. The machining characteristics of this P 20 steel and other difficult to machine metals and alloys can be analyzed using these P/M tool electrodes.
3. Surface integrity characteristics like Friction, wear behavior, micro-cracks and hardness of the surface machined thorough electro discharge machining process can be evaluated.
4. Rapid heating and cooling makes hardened layer on the wok-surface. Various characteristics of this layer can be analyzed.

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A REVIEW ON SOLAR ENERGY COLLECTION FOR THERMAL APPLICATIONS

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ABSTRACT

In this article, a review of the various types of solar energy collectors and their applications is presented. In the beginning, breakdown of various ecological problems linked with the consumption of conventional sources of energy are presented and the benefits offered by renewable energy systems are outlined. An introduction to the uses of solar energy is given followed by a description of the various types of collectors including flat-plate, compound parabolic, evacuated tube, parabolic trough, Fresnel lens, parabolic dish collectors. Characteristic applications of the different types of collectors are discussed in order to study the scope of their applicability. The applications include electricity generation, solar water heating, space heating and cooling, air and water systems and heat pumps, solar refrigeration, industrial process heat, desalination, solar furnaces etc. As can be seen solar energy systems can be used for a wide range of applications and delivers significant environmental benefits, therefore, they should be used whenever possible.

Keywords: Solar Energy; Renewable; Water Heating; Air Heating; Solar Collectors

INTRODUCTION

One of the most widely accepted definitions of sustainable development is: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. There are many factors that can help to achieve sustainable development. Today, one of the main factors that must be considered is energy and one of the most important issues is the requirement for a supply of energy that is fully sustainable. Such a supply in the long-term should be readily available at reasonable cost, be sustainable and be able to be utilized for all the required tasks without causing negative societal impacts. This is why there is a close connection between renewable sources of energy and sustainable development.

There are many alternative energy sources which can be used instead of fossil fuels. The decision as to what type of energy source should be utilized must, in each case, be made on the basis of economic, environmental and safety considerations. Because of the desirable environmental and safety aspects it is widely believed that solar energy should be utilized instead of other alternative energy forms, even when the costs involved are slightly higher. The greatest advantage of solar energy as compared with other forms of energy is that it is clean and can be supplied without any environmental pollution. The objective of this paper is to present the various types of collectors used to harness solar energy, their thermal analysis and performance, and a review of applications.

SOLAR COLLECTORS

Solar energy collectors are special kind of heat exchangers that transform solar radiation energy to internal energy of the transport medium. The major component of any solar system is the solar collector. This is a device which absorbs the incoming solar radiation, converts it into heat, and transfers this heat to a fluid (usually air, water, or oil) flowing through the collector. The solar energy thus collected is carried from the circulating fluid either directly to the hot water or space conditioning equipment, or to a thermal energy storage tank from which can be drawn for use at night and/or cloudy days.

There are basically two types of solar collectors: non-concentrating or stationary and concentrating. A non-concentrating collector has the same area for intercepting and for absorbing solar radiation, whereas a sun-tracking concentrating solar collector usually has concave reflecting surfaces to intercept and focus the sun's beam radiation to a smaller receiving area, thereby increasing the radiation flux. A large number of solar collectors are available in the market. In this section a review of the various types of collectors currently available will be presented. This includes FPC, ETC, and concentrating collectors.

STATIONARY COLLECTORS

Solar energy collectors are basically distinguished by their motion, i.e. stationary, single axis tracking and two-axes tracking, and the operating temperature. Initially, the stationary solar collectors were examined. These collectors are permanently fixed in position and do not track the sun. Three types of collectors fall in this category:

A. Flat Plate Collectors (FPC)

A typical flat-plate solar collector is shown in Fig. 1. When solar radiation passes through a transparent cover and impinges on the blackened absorber surface of high absorptivity, a large portion of this energy is absorbed

by the plate and then transferred to the transport medium in the fluid tubes to be carried away for storage or use. The underside of the absorber plate and the side of casing are well insulated to reduce conduction losses. The liquid tubes can be welded to the absorbing plate, or they can be an integral part of the plate. The liquid tubes are connected at both ends by large diameter header tubes.

The transparent cover is used to reduce convection losses from the absorber plate through the restraint of the stagnant air layer between the absorber plate and the glass. It also reduces radiation losses from the collector as the glass is transparent to the short wave radiation received by the sun but it is nearly opaque to long-wave thermal radiation emitted by the absorber plate (greenhouse effect).

FPC are by far the most used type of collector. FPC are usually employed for low temperature applications up to 100°C , although some new types of collectors employing vacuum insulation and/or TI can achieve slightly higher values [5]. Due to the introduction of highly selective coatings actual standard FPC can reach stagnation temperatures of more than 200°C . With these collectors, good efficiencies can be obtained up to temperatures of about 100°C .

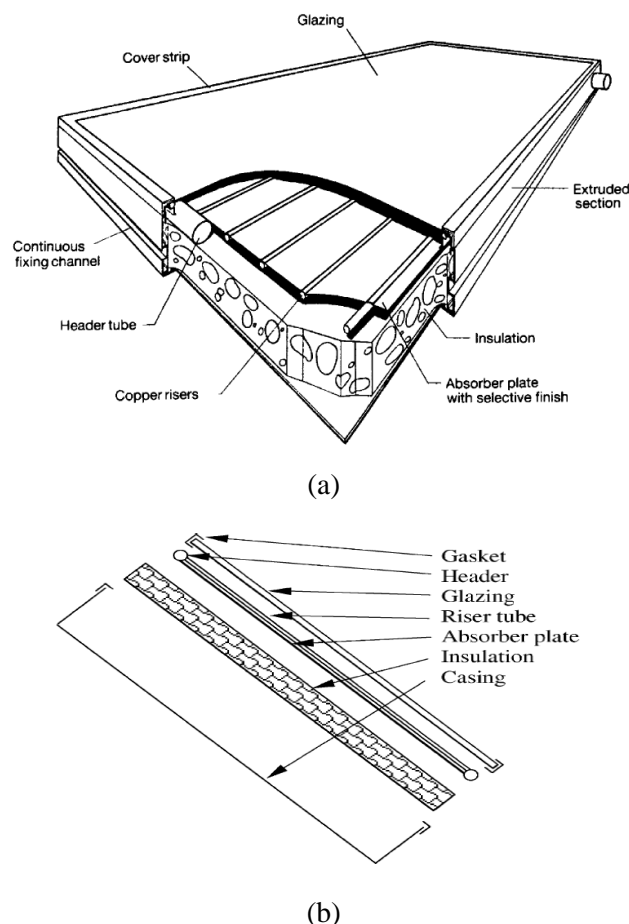


Fig-1: Schematic diagram of a typical flat plate collector (a) Isometric view (b) Exploded side view.

B. Compound Parabolic Collectors (CPC) CPC are non-imaging concentrators. These have the capability of reflecting to the absorber all of the incident radiation within wide limits. Their comprehensive review was carried out by [6-8]. The necessity of moving the concentrator to accommodate the changing solar orientation can be reduced by using a trough with two sections of a parabola facing each other, as shown in Fig. 2.

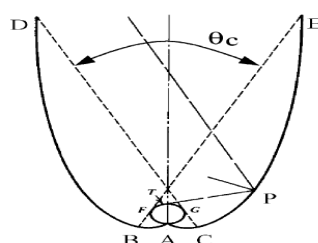


Fig-2: Schematic diagram of a compound parabolic collector.

Compound parabolic concentrators can accept incoming radiation over a relatively wide range of angles. By using multiple internal reflections, any radiation that is entering the aperture, within the collector acceptance angle, finds its way to the absorber surface located at the bottom of the collector [8,9].

C. Evacuated Tube Collectors (ETC) Conventional simple flat-plate solar collectors were developed for use in sunny and warm climates. Their benefits however are greatly reduced when conditions become unfavorable during cold, cloudy and windy days. Evacuated heat pipe solar collectors (tubes) operate differently than the other collectors available on the market. These solar collectors consist of a heat pipe inside a vacuum-sealed tube, as shown in Fig. 3.

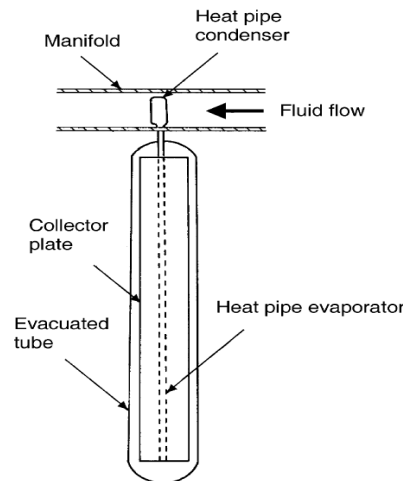


Fig-3: Schematic diagram of an evacuated tube collector.

ETC have demonstrated that the combination of a selective surface and an effective convection suppressor can result in good performance at high temperatures [9]. The vacuum envelope reduces convection and conduction losses, so the collectors can operate at higher temperatures than FPC. Like FPC, they collect both direct and diffuse radiation. However, their efficiency is higher at low incidence angles. This effect tends to give ETC an advantage over FPC in day-long performance.

2. Sun tracking concentrating solar collectors

Energy delivery temperatures can be increased by decreasing the area from which the heat losses occur. Temperatures far above those attainable by FPC can be reached if a large amount of solar radiation is concentrated on a relatively small collection area. This is done by interposing an optical device between the source of radiation and the energy absorbing surface. Concentrating collectors exhibit certain advantages as compared with the conventional flat-plate type. The main ones are:

1. The working fluid can achieve higher temperatures in a concentrator system when compared to a flat-plate system of the same solar energy collecting surface.
2. The thermal efficiency is greater because of the small heat loss area relative to the receiver area.
3. Reflecting surfaces require less material and are structurally simpler than FPC. For a concentrating collector the cost per unit area of the solar collecting surface is therefore less than that of a FPC. The collectors falling in this category are:

A. Parabolic Trough Collectors In order to deliver high temperatures with good efficiency a high performance solar collector is required. Systems with light structures and low cost technology for process heat applications up to 400°C could be obtained with parabolic through collectors (PTCs). PTCs can effectively produce heat at temperatures between 50°C and 400°C [10].

PTCs are made by bending a sheet of reflective material into a parabolic shape. A metal black tube, covered with a glass tube to reduce heat losses, is placed along the focal line of the receiver (Fig. 4). When the parabola is pointed towards the sun, parallel rays incident on the reflector are reflected onto the receiver tube. It is sufficient to use a single axis tracking of the sun and thus long collector modules are produced. The collector can be orientated in an east–west direction, tracking the sun from north to south, or orientated in a north–south direction and tracking the sun from east to west.

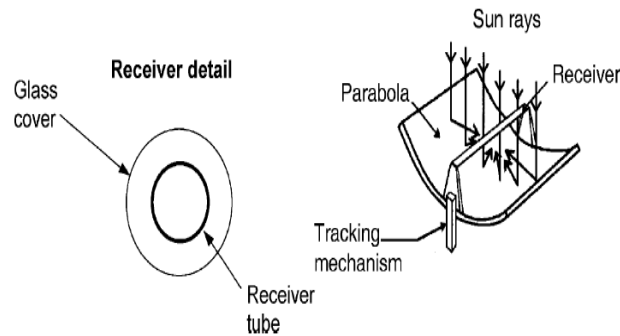


Fig-4: Schematic of a parabolic trough collector.

B. Linear Fresnel Reflector LFR technology relies on an array of linear mirror strips which concentrate light on to a fixed receiver mounted on a linear tower [11]. The LFR field can be imagined as a broken-up parabolic trough reflector, but unlike parabolic troughs, it does not have to be of parabolic shape, large absorbers can be constructed and the absorber does not have to move. A representation of an element of an LFR collector field is shown in Fig. 5.

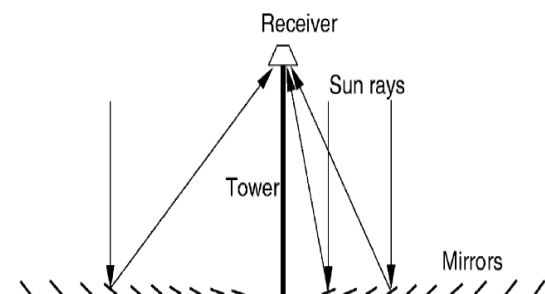


Fig-5: Schematic diagram of a downward facing receiver illuminated from an LFR field

The greatest advantage of this type of system is that it uses flat or elastically curved reflectors which are cheaper compared to parabolic glass reflectors. Additionally, these are mounted close to the ground, thus minimizing structural requirements.

C. Parabolic Dish Collector A parabolic dish reflector, shown schematically in Fig. 6, is a point-focus collector that tracks the sun in two axes, concentrating solar energy onto a receiver located at the focal point of the dish. The dish structure must track fully the sun to reflect the beam into the thermal receiver.

The receiver absorbs the radiant solar energy, converting it into thermal energy in a circulating fluid. The thermal energy can then either be converted into electricity using an engine-generator coupled directly to the receiver, or it can be transported through pipes to a central power-conversion system.

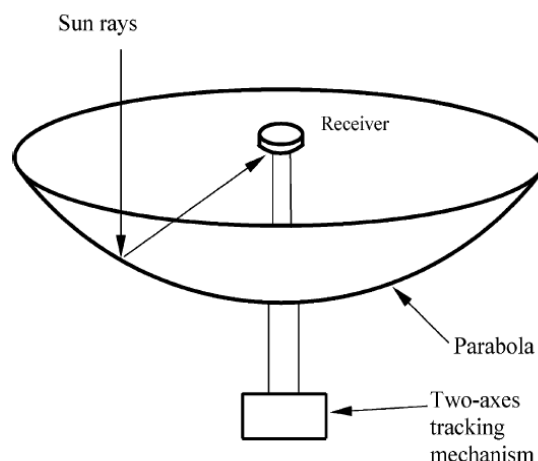


Fig-6: Schematic of a parabolic dish collector.

Parabolic-dish systems can achieve temperatures in excess of 1500°C. Because the receivers are distributed throughout a collector field, like parabolic troughs, parabolic dishes are often called distributed-receiver systems.

SOLAR COLLECTOR APPLICATIONS

Solar collectors have been used in a variety of applications. These are described in this section. In Table __ the most important technologies in use are listed together with the type of collector that can be used in each case.

D. Solar water heating systems

The main part of a SWH is the solar collector array that absorbs solar radiation and converts it into heat. This heat is then absorbed by a heat transfer fluid (water, non-freezing liquid, or air) that passes through the collector. This heat can then be stored or used directly [12]. In solar water heating systems, potable water can either be heated directly in the collector (direct systems) or indirectly by a heat transfer fluid that is heated in the collector, passes through a heat exchanger to transfer its heat to the domestic or service water (indirect systems) [13]. The heat transfer fluid is transported either naturally (passive systems) or by forced circulation (active systems). Natural circulation occurs by natural convection (thermosyphoning) [14], whereas for the forced circulation systems pumps or fans are used.

Five types of solar energy systems can be used to heat domestic and service hot water: thermosyphon, ICS, direct circulation, indirect, and air. The first two are called passive systems as no pump is employed, whereas the others are called active systems because a pump or fan is employed in order to circulate the fluid.

E. Solar Space Heating and Cooling

The components and subsystems of solar collectors are employed for solar heating and cooling systems. There are again two principal categories of such systems, passive and active. The fluid used for heating and cooling is generally air and the collectors used for space heating are also called solar air heaters [15,16].

The term passive system is applied to buildings that include as integral part of the building elements, that admit, absorb, store and release solar energy and thus reduce the needs for auxiliary energy for comfort heating. As no solar collectors are employed in the passive systems in this paper, only active systems are considered.

Active solar space systems use collectors to heat a fluid, storage units to store solar energy until needed, and distribution equipment to provide the solar energy to the heated spaces in a controlled manner. A complete system includes additionally pumps or fans for transferring the energy to storage or to the load which require a continuous availability of non-renewable energy, generally in the form of electricity [17].

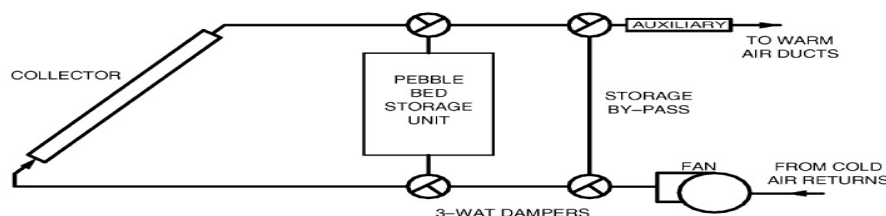


Fig-7: Detail schematic of a solar air heating system

Solar cooling of buildings is an attractive idea as the cooling loads and availability of solar radiation are in phase. Additionally, the combination of solar cooling and heating greatly improves the use factors of collectors compared to heating alone. Solar air conditioning can be accomplished by three types of systems: absorption cycles, adsorption (desiccant) cycles and solar mechanical processes.

F. Solar refrigeration

Solar cooling can be considered for two related processes: to provide refrigeration for food and medicine preservation and to provide comfort cooling. Solar refrigeration systems usually operate at intermittent cycles and produce much lower temperatures (ice) than in air conditioning. When the same cycles are used in space cooling they operate on continuous cycles. The cycles employed for solar refrigeration are the absorption and adsorption [18]. During the cooling portion of the cycles, the refrigerant is evaporated and reabsorbed. In these systems the absorber and generator are separate vessels. The generator can be integral part of the collector, with refrigerant absorbent solution in the tubes of the collector circulated by a combination of a thermosyphon and a vapour lift pump [19].

There are many options available which enable the integration of solar energy into the process of 'cold' production. Solar refrigeration can be accomplished by using either a thermal energy source supplied from a solar collector or electricity supplied from photovoltaics. This can be achieved by using either thermal adsorption or absorption units or conventional refrigeration equipment powered from photovoltaics. Solar refrigeration is employed mainly to cool vaccine stores in areas with no mains electricity and for solar space cooling.

Photovoltaic refrigeration, although uses standard refrigeration equipment which is an advantage, has not achieved widespread use because of the low efficiency and high cost of the photovoltaic cells.

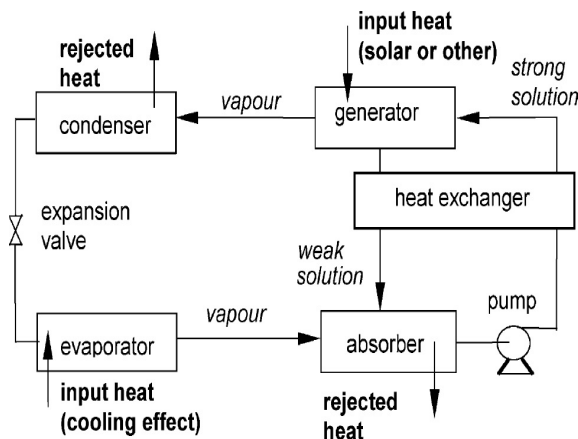


Fig-8: Schematic of Solar refrigeration system.

G. Solar Desalination

About 97% of the earth's water is salt water in the oceans; 3% of all fresh water is in ground water, lakes and rivers, which supply most of human and animal needs. Water is essential to life. The importance of supplying potable water can hardly be overstressed. Man has been dependent on rivers, lakes and underground water reservoirs for fresh water requirements in domestic life, agriculture and industry. However, rapid industrial growth and the population explosion all over the world have resulted in a large escalation of demand for fresh water. Added to this is the problem of pollution of rivers and lakes by industrial wastes and the large amounts of sewage discharged. The only nearly inexhaustible sources of water are the oceans. Their main drawback, however, is their high salinity. It would be attractive to tackle the water-shortage problem with desalination of this water.

Desalination can be achieved by using a number of techniques. These may be classified into the following categories:

- phase-change or thermal processes; and
- membrane or single-phase processes.

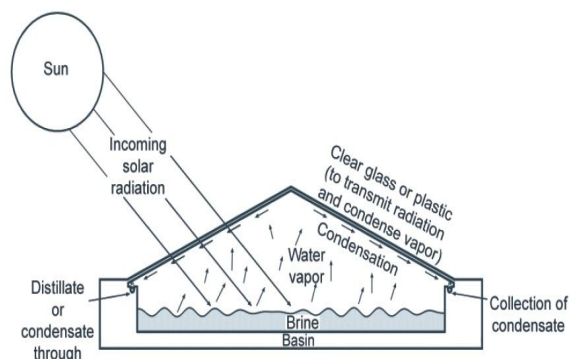


Fig-9: Schematic of Solar desalination system.

Solar energy can be used for sea-water desalination either by producing the thermal energy required to drive the phase change processes or by producing electricity required to drive the membrane processes. Solar desalination systems are thus classified into two categories, i.e. direct and indirect collection systems [20]. As their name implies, direct collection systems use solar energy to produce distillate directly in the solar collector, whereas in indirect collection systems, two sub-systems are employed (one for solar energy collection and one for desalination) [21]. Conventional desalination systems are similar to solar systems since the same type of equipment is applied. The prime difference is that in the former, either a conventional boiler is used to provide the required heat or mains electricity is used to provide the required electric power, whereas in the latter, solar energy is applied.

A representative example of direct collection systems is the conventional solar still, which uses the greenhouse effect to evaporate salty water. It consists of a basin, in which a constant amount of seawater is enclosed in a v-

shaped glass envelope [22]. The sun's rays pass through the glass roof and are absorbed by the blackened bottom of the basin. As the water is heated, its vapour pressure is increased. The resultant water vapour is condensed on the underside of the roof and runs down into the troughs, which conduct the distilled water to the reservoir

H. Solar thermal Power Systems Conversion of solar to mechanical and electrical energy has been the objective of experiments for more than a century, starting from 1872 when Mouchot exhibited a steam-powered printing press at the Paris Exposition. The idea is to use concentrating collectors to produce and supply steam to heat engines.

The basic process for conversion of solar to mechanical energy is shown schematically in Fig.10. The process of conversion of solar to mechanical and electrical energy by thermal means is fundamentally similar to the traditional thermal processes [23]. These systems differ from the ones considered so far as these operate at much higher temperatures. Energy is collected by concentrating collectors, stored (if appropriate), and used to operate a heat engine. The main problem of these systems is that the efficiency of the collector is reduced as its operating temperature increases, whereas the efficiency of the heat engine increases as its operating temperature increases. The maximum operating temperature of stationary collectors is low relative to desirable input temperatures of heat engines, therefore concentrating collectors are used exclusively for such applications [23].

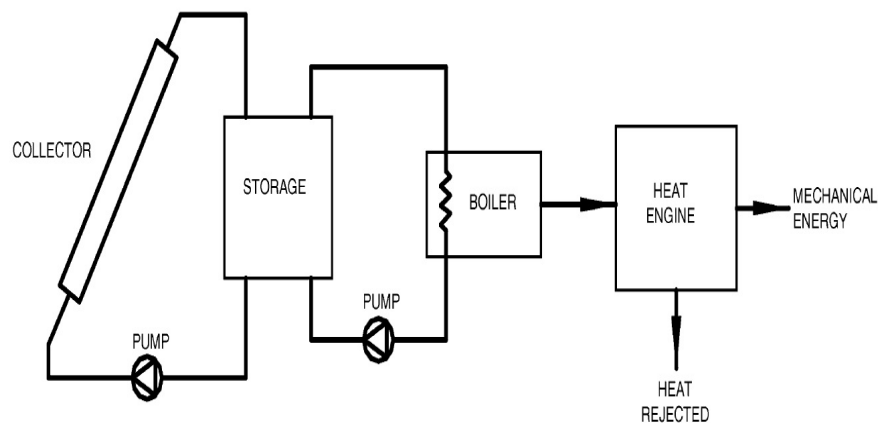


Fig-10: Schematic of a solar-thermal conversion system.

CONCLUSIONS

Several of the most common types of solar collectors are presented in this paper. The various types of collectors described include flat-plate, compound parabolic, evacuated tube, parabolic trough, Fresnel lens and parabolic dish type collector. Additionally, typical applications are described in order to show to the reader the extent of their applicability. These include water heating, space heating and cooling, refrigeration, industrial process heat, desalination, thermal power systems, solar furnaces and chemistry applications. It should be noted that the applications of solar energy collectors are not limited to the above areas. There are many other applications which are not described here either because they are not fully developed or are not matured yet. The application areas described in this paper show that solar energy collectors can be used in a wide variety of systems, could provide significant environmental and financial benefits, and should be used whenever possible.

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RELATIONS AND UTILITY OF MATHEMATICS IN OTHER FIELDS - A REVIEW

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ABSTRACT

The mathematics has drastically engineering, agricultural, medical and applied sciences (Physics, Chemistry and Biology) etc. The modern mathematicians are creating the bridge with other fields. Addressing the bigger questions of life “How information flows in brain (Neuroscience), dynamics of disease. Mathematics is widely used in everywhere like making Google the best search engine due to linear algebra. It has ability to solve and quantify e.g. “relevance with help of mathematics”. Now a day it is widely used in designing complex models to address the future population problems of traffic, home, food, security, transportation etc. So Mathematics is just not a calculation but also is a magic tool of nature with us to understand nature and life. This paper represents the review of utilization of mathematics in other fields.

Keywords: Utilization and collaboration with e.g. Engineering, Agricultural, and Management Applied sciences, Medical Sciences (Human Brain, Neurosciences)

INTRODUCTION

Mathematics has vital mission for the enhancement engineering, science, philosophy, biotechnology etc. It provides solution to various problems which are very helpful for the application in different areas. This Paper represents the examples of functional areas, where mathematics is emerging as a fundamental component for the other discipline in research. “Mathematics is the mother of all Sciences” “We will always have STEM with us. ‘Mathematics is the science of measurement, quantity and Magnitude’. It is exact, accurate, precise, systematic and a logical subject. This paper represents the review about the application of Mathematics in other disciplines.

Mathematics in Engineering: - Mathematics is backbone of engineering field and it widely used in various engineering fields like civil, mechanical, Architect, Electronics, electrical and computer. In civil engineering the mathematics is applied from simple pillars of your home to large dams and bridges. How many material used to create any building, we can now use the mathematics. To check the mileage of car, distance of traveling destination. Figure no. 1 depicts the degree of mathematics in engineering Career.

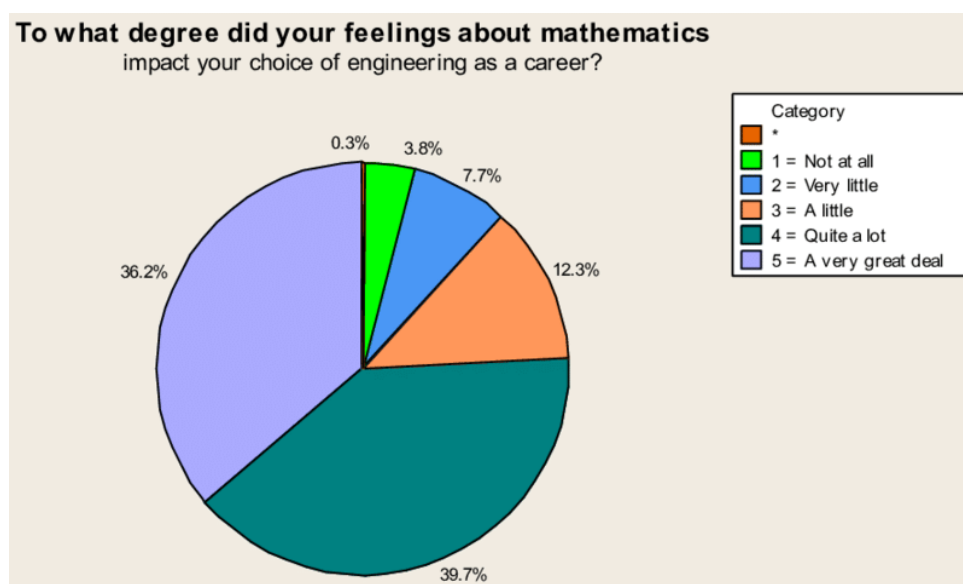


Fig-1: The degree of mathematics as career in different field of engineering.

Engineers say that computational tools are “a different type of mathematics” usage that offers speedy and standard solutions when interpreted correctly and are broadly used in engineering problems. The ever-increasing availability of computerized techniques and tools. The Civil engineering has majors tended rating mathematics as lower on average as compared to the students in other fields. With the average rating of 1.74 as compared with 2.26 and 2.23 for the mechanical engineering and ICT/Electrical engineering majors. Figure.2 depicts the rating factor between civil, mechanical, ICT and electrical.

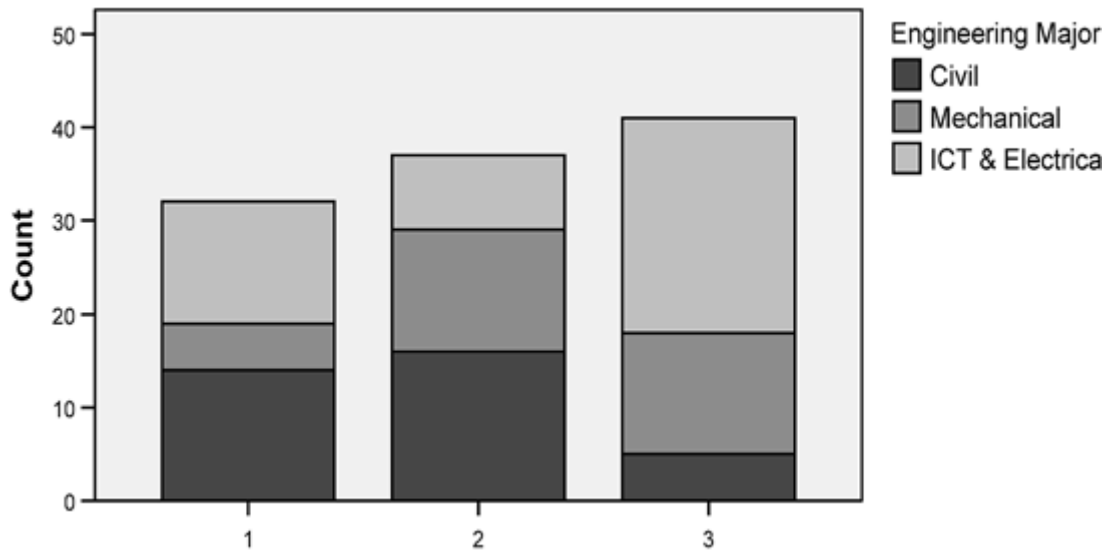


Fig-2: The rating factor between different fields of engineering

Mathematics in Management: Now a day's, Mathematics is widely used in all type of organizations e.g. marketing, sales forecasting, accounting, inventory management and financial analysis. The economics majors are planning to continue use of mathematics in graduate school. Those are strongly recommended to take regular calculus instead of business calculus, linear algebra and other higher maths courses. The other optimization techniques like linear programming, matrix algebra, probability theory; those are used for business mathematics program. Mathematics helps to minimize the losses and maximize the profits by techniques like determining ideal pricing, analyzing production costs, discerning sales patterns for future sales.

Mathematics is widely used for Census, Analysis of data, for calculating data regarding Controlling the Inflation, calculating the population etc. We can say that without mathematics Business can't be existing.

Mathematics in Medical Field: Medical field is very interesting field for the career orientation. The variations in the field of medicines created abundance of jobs. Advancements in new technology, curing diseases and saving lives are possible through elementary mathematics, geometry and algebra. For drawing up statistical graphs of epidemics or success rates of treatments the medical professionals use maths along with x-rays and CAT scan, which is a special type of x-ray called a Computerized Axial Tomography Scan. In the field of medical sciences accuracy matters so it is very useful for nurses and doctors for mathematical calculations for complex tasks. Information through the numbers can help the nurses to communicate with doctors and patients as well. Figure 3 depicts the complexity of brain scanning pictures and understanding the different views through computational techniques using mathematics.

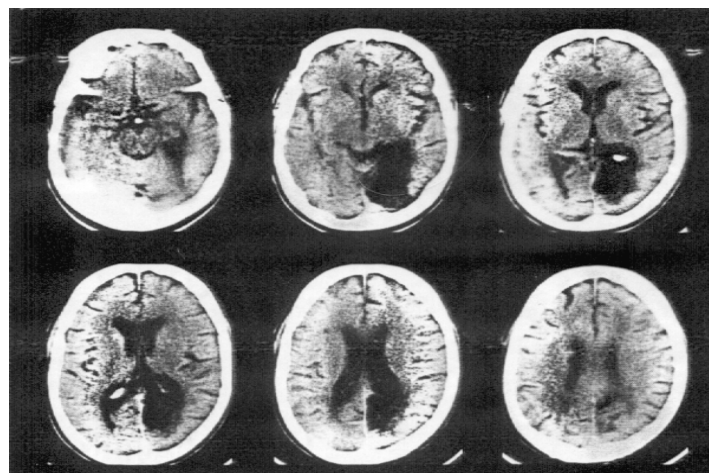


Fig-3: the different view of brain scanning

Mathematical Neuroscience: -It focuses on developing a model neuronal activity. Major problem of neuroscience is how does the nervous system process flow of information? Main problem of Population genetics: how genetic mutations and selection are propagated in a population. Epidemiology: dynamics of diseases are not easy to understand so Mathematics is playing vital role in the solution of these problems.

Human brainMathematics: DARPA (Defense Advanced Research Projects Agency) freshly asked for mathematical model building proposal of the human brain. This proposal can modify the way through digital computers can be build. So the modification in altering the views of intelligence and consciousness and our humanity can easily be made.

Ratios and Proportions: For administering the medication for the patients, the nurses use ratios and proportions. They need to recognize the quantity of medicine, which a patient needs depending on their physical attributes like age and weight. Nurses need to understand the doctor's instructions for prescribing the dose for the patient e.g. such instruction may be given as: 25mcg/kg/min. For weighing of 52 kg of the patient the amount of how many milligrams the patient should receive in one hour. For this task the nurses use conversion formulas to convert micrograms (mcg) to milligrams (mg). Let say, if the (1mcg = .001mg), we can easily get the amount (in mg) of 25mcg through a proportion as shown in formula ahead.

By using Cross Multiplication we can find the amount in (mg). By using the optimization tools, techniques and governing equations like differential equations and statistics in modelling for predicting cardiac defibrillation, potential drug targets, comparing human brains, screening treatments for harmful side effects.

Mathematics in Agriculture: Agriculture is vast field, which purely dependent on climate and changes in weather. Mathematics acts as a crucial part in agri-tech modernization. It is obvious that farmers are going to farm for earnings throughout the year, this is to be understood that maths is saying about their financial conditions, bank loans, EMIs, weather conditions, productivity from their workforces, season and the market etc. The correct and timely decisions can easily be made through the appropriate calculations using maths e.g. difference between profit and loss, the quantity and types of farming different crops around the years. In the field of Agriculture the Mathematics can be used as follows:-

- 1) Calculating the areas of Lands
- 2) Predictions for calculating day, weeks and months for the crops to be fully grown to harvest.
- 3) Computing the areas
- 4) Consideration of volume and weight
- 5) Planning for planting the crops by having the information by counting the most harvested crops per harvesting time.
- 6) Keeping track with banks and other account.
- 7) **Mathematics in Physics, Chemistry and Biology:** As we Know "Mathematics is mother of all Sciences" In Physics, Chemistry, and Biology. For Measuring the distance, speed, velocity, acceleration we used differential operators as shown in formula ahead.

Mathematics is used for collecting numbers of electron, protons for the structure of atoms without mathematics it is impossible. In Physics mathematics has vital role for wave equation, Electric Current, circuit etc. Biology is incomplete without mathematics. Modern mathematicians sometimes dismiss physics as "applied mathematics" The problem of the planets created the discipline of dynamical systems. The heat, wave, and Maxwell's equations drove the development of partial differential equations. Now a day, the crystallography is moderately answerable for the progress of group theory. Mechanics of Quantum is a vital stimulus for functional analysis, relativity theory for problems in geometry and string theory. Figure 4 (a, b) depicts the relation and map of mathematics with other fields.

CONCLUSION

Mathematics is virtually a phenomenon of nature which we are applying in general life. There is no any other field in which we can't apply Mathematics. The advance governing equations has bridged the gap between mathematics and other field like Engineering, Medical science, Agriculture, and applied sciences. Mathematical science has created an interest in the maintenance of a strong mathematical science enterprise for globally in order to contribute to the supply of well-trained persons in science, technology, engineering and mathematical (STEM) fields.

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GROWTH RATES OF ECONOMIC SECTORS: A CASE OF PUNJAB

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ABSTRACT

Punjab has attained remarkable growth since independence. This growth is a result of green revolution and adoption of new technology. The contribution of Punjab economy to Gross State Domestic Product (GSDP) was 26.93 per cent in the year 2015-16. Punjab economy is considered as the food bowl of India from decades. Punjab is considered as the state of painstaking farmers who have carried out incomparable efforts to bring the state an identity on the global picture. The enhancement in the inputs, irrigation facilities, technology and pulsating policies of the government has led the state to get a dominating and role model position in the country. Punjab is endowed with fertile land and a favorable climate to grow a large number of cereals, fruits and vegetables, oil seeds, pulses and maize etc. The state has basic raw materials, man power as well as a vast consumer market, which are the necessary pre-requisites for the industrial production. The vast potentials of resources available in Punjab can be better utilized by sustainable usage of available technologies. The present study discusses the contribution of three major sectors at the state and national level. The comparative analysis of sector wise growth of Punjab with India and status of growth rate of primary, secondary and tertiary sectors during 10th, 11th and 12th five year plans has been performed.

INTRODUCTION: PUNJAB'S ECONOMY

Punjab is one of the northernmost states of India. The confluence of five rivers makes Punjab's agricultural land rich and productive. Approximately 82 per cent of the state's land is under cultivation compared with the national average of 40 per cent. By 2025, it is expected that the state will be among the leading producers of non-food grains as well as exporter of various agri-products. Occupying only 1.5 per cent of India's geographical area, the state accounts for about 17 per cent of the country's wheat production and 11 per cent of rice production. This makes it suitable for agro-based industries, dairy farming and products, and other food processing industries.

Punjab has been ranked first in India in terms of infrastructure facilities offered. Punjab's road, rail and air transport network, connectivity, construction of bridges and infrastructure facilities are rated among the best. As of June 2016, Punjab had a total installed power generation capacity of 12,936 megawatt (MW). The state has attracted Foreign Direct Investment (FDI) equity inflows worth US\$ 1.35 billion during the period April 2000 to March 2016, according to data released by Department of Industrial Policy and Promotion (DIPP). Punjab has easiest Procedures to set up a business, according to a study by the World Bank and KPMG. Punjab had set up a Bureau of Investment Promotion (BIP) in December 2013 for one-stop clearance of investment proposals. Punjab has emerged as a key hub for textile-based industries including yarn, readymade garments and hosiery. With the development of apparel parks, favourable textile policy and other incentives for the creation of textile infrastructure, the state offers opportunities for investment. The average gross state domestic product (GSDP) growth rate for the state of Punjab was about 10.12 per cent between 2004-05 and 2015-16. The state provides investment opportunities in sectors such as textiles, agro-based industries, IT & ITeS, automotive and auto components, sports goods and light engineering goods.

Punjab's economy has grown at annual growth rate of 5.23 per cent consistently against the national average rate of 7.8 per cent during the tenth plan period. During Eleventh Plan period the target of growth for the state is fixed at 5.90 per cent against the national target of 9 per cent (now reduced to 7 to 8 per cent). The crisis in the farm sector of Punjab has now started manifesting through falling farm yields on account of soil nutrients and absence of preparation of new seeds varieties (which is necessary for boosting the yield every year), depletion of ground water resources and mounting farm indebtedness. The present agriculture system is increasingly becoming ecologically and even economically unsustainable. However Punjab hopes for resurging as a front runner up state in economic growth that hinges on rejuvenation of its agriculture sector as well as successfully expanding its manufacturing and service sectors thus bringing about drastic structural changes in the primary sector.

Table -1: Sector-wise Growth Rates-1980-81 Onwards (At Constant Price Percent per Annum

Year	PUNJAB				INDIA			
	PRIMARY	SECONDARY	TERTIARY	OVERALL	PRIMARY	SECONDARY	TERTIARY	OVERALL
At 1980-81 Prices								
1981-82	10.57	13.13	3.58	8.92	6.2	7.59	4.96	6.1
1982-83	3.16	1.49	4.44	3.19	(-)0.69	4.3	6.5	3.1
1983-84	-0.85	7.12	4.05	2.24	10.43	9.17	5.15	8.18
1984-85	10.95	4.49	3.61	7.35	0.03	6.3	6.27	3.84
1985-86	8.41	12.93	3.38	7.88	0.52	4.53	7.41	4.08
1986-87	-0.61	7.12	7.99	3.48	(-)1.02	6.9	7.59	4.28
1987-88	4.73	5.14	5.57	5.07	0.53	6.64	6.08	4.32
1988-89	3.2	11.36	5.79	5.39	16.26	8.72	7.27	10.65
1989-90	10.84	6.88	3.42	8.14	1.99	10.48	8.86	6.89
1990-91	-1.32	3.39	3.36	1.11	4.17	7.01	5.21	5.36
1991-92	8.07	3.05	1.54	4.99	(-)1.98	(-)1.66	4.94	0.82
1992-93	2.26	9.87	4.62	4.71	5.75	4.42	5.44	5.26
1993-94	3.89	8.8	3.53	5.01	3.56	6.91	7.74	6.17
At 1993-94 Prices								
1994-95	2.03	4.79	3.01	2.95	5.32	9.26	7.01	6.98
1995-96	0.05	8.85	6.76	4.16	(-)0.35	12.47	10.31	7.31
1996-97	7.03	3.04	10.82	7.35	8.84	6.56	7.14	7.51
1997-98	14.50	10.55	7.74	3	(-)1.47	3.6	9.78	4.77
1998-99	3.5	10.65	5.09	5.59	5.91	3.84	8.34	6.5
At 1999-2000 Prices								
1999-2000	7.28	(-)0.76	8.31	5.63	0.57	4.95	10.06	6.07
2000-01	1.42	5.66	5.32	3.93	(-)0.02	6.75	5.65	4.35
2001-02	0.84	(-)2.08	5.21	1.92	5.86	2.82	7.1	5.81
2002-03	11.15	3.02	6.25	2.85	(-)5.89	6.89	7.47	3.84
2003-04	5.77	6.85	5.92	6.07	9.29	7.8	8.49	8.52
2004-05	2.16	10.1	4.52	4.95	0.79	10.54	9.13	7.47
At 2004-05 Prices								
2005-06	0.95	11.2	6.64	5.9	4.64	10.68	10.91	9.48
2006-07	2.85	21.4	8.69	10.18	4.58	12.66	10.06	9.57
2007-08	3.84	16.6	7.52	9.05	5.52	10.27	10.27	9.32
2008-09	2.05	4.22	9.57	5.85	0.36	4.66	9.98	6.72
2009-10	2.82	8.79	8.63	6.29	1.47	9.46	10.5	8.59
2010-11	1.65	6.27	9.44	6.52	8.32	7.64	9.67	8.91
2011-12	1.81	2.38	11.82	6.52	4.36	8.49	6.57	6.69
At 2011-12 Prices								
2012-13	0.87	2.23	8.56	5.32	1.2	4	8.1	5.6
2013-14	3.71	3.67	6.94	6.32	4	5.3	7.8	6.6
2014-15	-3.4	3.59	8.94	4.92	1.4	5.4	10.3	7.2
2015-16(A)	5.22	3.14	6.29	5.96	2	7.4	9.2	7.6

Statistical Abstracts, Government of Punjab, Various Issues

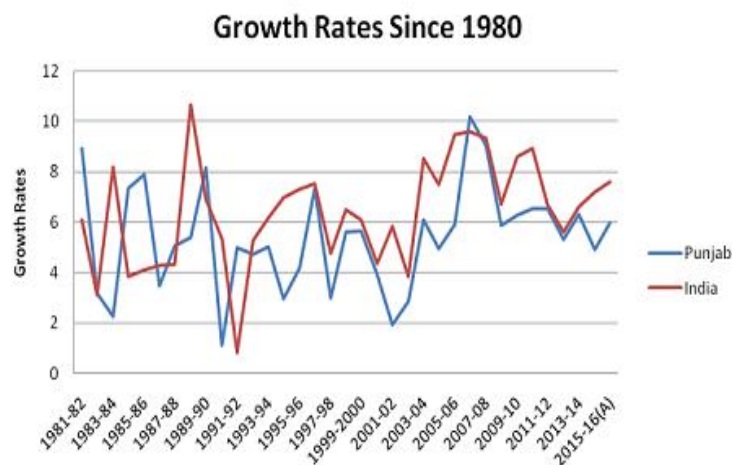


Figure-1.1: depicts the growth rates of Punjab and India since 1980.

A) Trends in Primary sector

Punjab has recorded a very high rate of growth in agriculture since the inception of planning in 1950/51. It was during the 1950s that the basic institutional and economic infrastructures were created in agriculture through

land reforms and massive public investments. These investments were made in development of irrigation and electric power, foundation of agricultural research and extension services, strengthening of the cooperative credit structure, and expansion of markets. Simultaneously, land reform legislation was passed and put into effect. Because of large-scale investment in irrigation and other rural infrastructure as well as changes in institutional structure, Punjab was able to record an agricultural growth rate as high as 4.6 percent during 1950/51-1964/65— long before the onset of the "green revolution." Both area expansion and yield increases contributed to this growth.

The introduction of the new seed-fertilizer technology in the mid-1960s marked the beginning of a new chapter in the history of Punjab agriculture. Under the impact of technological improvements from the late 1960s, there appears to have been an unparalleled rise in agricultural production and productivity. Some of the salient features are described below:

First, with adoption of the new production technology during the late 1960s there was a remarkable expansion of area under wheat and rice, while the cultivation of most other crops (for which there was a conspicuous absence of improved technology) registered a slow but persistent decline. It was the technology-price-profitability advantage of rice and wheat over other crops that was reflected in differential growth in area and output of various crops.

Second, as expected with improved technology, yield rates grew impressively in rice and wheat compared with most other crops.

Third, as a result of rapid growth in both area and yield, the output growth for wheat and rice since the late 1960s has been dramatic.

By 1984/85, these two crops had become the predominant crops of the state and accounted for the major proportion of the total value of agricultural output. The expansion in area under wheat and rice, for which new technology was available, not only necessitated increasing purchases of modern inputs from other sectors of the domestic economy and from outside the state, but also generated increasing levels of marketable surpluses of these crops. As a result, Punjab agriculture became increasingly commercialized and interlinked with the national market. During the year 2015-16 the agriculture sector has witnessed 5.22 per cent growth, which was the highest as compared with growth rates during one decade.

B) Trends in Secondary sector

This sector covers the manufacturing, construction and power sectors. Although Punjab is primarily an agrarian state, yet its future lies in the development of industry mainly through development of agro- based, service and knowledge based industries.

During 1960/ 61-1983/84, income from registered manufacturing in Punjab grew at an annual rate of 7.8 percent, while that from unregistered manufacturing increased at a rate of 6.7 27 percent. During this period the growth rate of income from manufacturing in India as a whole was only 4.3 percent. The nature and composition of manufacturing has undergone a notable change, especially since the advent of the green revolution in the mid-1960s. The 1960s witnessed a phase of rapid agro-industrialization, and the output of small units manufacturing agricultural tools and implements showed particularly fast growth in response to mounting demand from rapidly growing agriculture. In addition, the increase in rural income led to much higher demand for consumption goods. Consequently, many small-

scale consumer goods industries came into being. The agro-industries manufacturing agricultural implements and machine tools, fertilizers, pipes and fittings, and automobile parts, and the processing industries such as cotton textiles, sugar, wheat flour, and rice-shelling grew continuously over the 1960/61-1983/84 period. With the establishment of some new large industries such as fertilizers, electronics, and tractors in the public sector, and the expansion of the private sector in textiles and hosiery because of export demand, many consumer goods industries in the registered sector also started to grow rapidly.

Large & Medium Scale Units: There were 586 large and medium scale units during the year 2006-07, with a fixed investment of Rs. 25000 crore which provided employment to 2.31 lakh persons with a turnover of Rs. 37500 crore. Small Scale units Industrial Scenario in Punjab is dominated by Small Scale Industrial units. Promotion of small scale industries has been regarded as an important element of the development strategy. During the year 2006-07, there were 205222 Small Scale Units with a fixed investment of Rs.5500 crore which generated employment to 9.64 lakh persons with a production value of Rs.35000 crore.

A few reasons can be advanced for manufacturing growth lagging behind expectations:

- The first is import leakages.
- Second, because of the extraordinary increase in output in many cases, the existing processing capacities fall far short of requirements. For example, as of January 1, 1983, with a 16.2 percent share in the production of raw cotton, Punjab had only 1.7 percent of all installed spindles and 0.6 percent of all looms in India. With 21.4 percent of wheat output and a 62.0 percent share in wheat procured by the Food Corporation of India, the state had merely 5.8 percent of the roller flour mill capacity in the country. With the recent development of a new variety (COJ 64), Punjab has emerged as one of the most efficient producers of sugarcane, but with 3.4 percent of total cane output, the state had only 1.8 percent of the national capacity for cane conversion. Thus lack of investment in agro-processing seems to be one important reason for the slower-than-expected growth rate of manufacturing.
- Other reasons are perhaps sociological. It takes a long time for peasant societies to switch over to the regular rhythm and discipline of industrial culture. Also, the tensions in Punjab during the 1980s have certainly resulted in further reducing industrial investments in the state and in driving away prospective entrepreneurs.

In the year 2015-16, Secondary sector has observed 3.14 per cent of growth which has been considered very low when compared with the year 2006-07.

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In the year 2015-16, Secondary sector has observed 3.14 per cent of growth which has been considered very low when compared with the year 2006-07.

C) Trends in Tertiary sector

From 1960/61 to 1983/84, while income from the tertiary sector as a whole recorded an annual growth rate of 6.8 percent that from trade and transport grew at a rate of more than 6.5 percent, banking and insurance at 8.1 percent, and public administration at 8.6 percent. Growth of the tertiary sector is an essential concomitant of a growing economy. For example, the rapid growth of trade and transport is in response to marked increases in marketed agricultural surpluses, much larger activity in agro-processing and agro-input industries, and increased flow of exports and imports. Of particular interest in this context is the role of small market villages and towns that lie on main roads connecting larger townships. These villages and towns have gradually become hubs of economic activity, not only in trading and agro-processing and repairs but also in the provision of social services, health, and recreation. In many cases they have emerged as tiny growth centers serving a network of peripheral villages. The rapid growth of trade, hotels and restaurants, and personal services is in response to increased consumption expenditure. Government and private expenditure on education, health, and other services is also rising rapidly. Rapid growth of public administration is primarily due to the growing role of the state in the development process as well as the excessive overstaffing characteristic of developing countries.

The year 2015-16 has reported 6.24 per cent growth service sector. Table 1.1 elaborated that contribution of Territory Sector to GDP has increased during last decade.

CONCLUSION

After a long era of simulated stability, the movement of labour away from agriculture - a route concurrent with economic development - has gathered impetus from last two decades. The economy is witnessing the occupational shift. Punjab and Indian economy has witnessed similar trend as far as the contribution to GDP is concerned. In the year 2007-08 the contribution of territory sector to total GDP of Punjab was 9.57 and India was 9.98. The territory sector is flourishing, but it cannot help much to engage the budding low and unskilled labour force. Punjab, thus, remains very much an agrarian economy although its share in the Gross Domestic Product (GDP) has declined.

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AN OVERVIEW OF REPORT ON APPLICATION OF BEHAVIORAL INSIGHTS TO FINANCIAL LITERACY AND AND EDUCATION PROGRAMS AND INITIATIVES

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ABSTRACT

An ambitious thrust is felt for applying of the behavioral insights in financial literacy and educational initiatives to enhance effectiveness and long term impact in financial decision behavior of Individuals. The present study is an overview of report on surveys (by IOSCO committee 8 on Retail Investor (C8) and OCED/INEF on their members) related to application behavioral insights (BI) to the investor educational programs and initiatives. The survey attempts to identify the approaches of BI that may be considered by stakeholders for designing financial education initiatives. Though the report explain seven behavioral framework for designing interventions for desired behavioral change, yet there is need to generate cost effective approaches for building new behavioral framework/model or behavior change design, based on own experience of stakeholders. The report shows that majority of respondents (IOSCO and OCED/INEF members) reported that they are actively seek or learn about behavioral insights through various resources like available literature, events and networks to maximize the efficacy of Financial Literacy and Educational Initiatives. The report is an evident that almost of half of the respondents is not applying BI in Financial Literacy and education initiatives but expressed their willingness for this in future initiatives for deeper understanding of Investor decision making and behavior.

Keywords: Behavioral Insights, Behavioral Frameworks, Behavioral Techniques, Financial Literacy, Investor Education

INTRODUCTION

Behavioral insights is an inductive approach that focus on discovering the human behavior about making choices through empirical testing by combines various insights from psychology, cognitive and social sciences. Since there are number of barriers like psychology, cognitive and social factors that influence the humans' financial decisions.

A great emphasis has been given on the exploring the application of Behavioral economics to the financial literacy and education programmes/Initiatives for retail investor since the inception of Committee 8 on Retail Investor by International Organization of Securities Commission IOSCO[1]. The evident of the financial crisis, under normative approach based on the assumption of 'Rationality of Investor' fails to explain the behavior of investor. Thus there is a thrust to know how an investor actually thinks and behaves[2]. Behavioral Science aims bring about the way of people thinking and behaving through empirical evidences resultants from psychological, cognitive and social factors. Behavioral Insights are considered as a device to have information about the investors' behavioral that helps in designing effective financial literacy programmes and initiatives. Such behavioral insight approaches and frameworks will be helpful tools in hands of Policy makers and security regulators for desirable financial decision behavior.

The report on survey "Application of Behavioral Insights to Financial Literacy and Investor Education Programmes and Initiatives" highlights important key concepts and reviews of literature related to insights from behavioral sciences. The report also provides researches related to application of behavioral insights in designing the financial literacy programmes and initiatives. The report elaborates essential features of BI for designing the interventions like public policy that aim to achieve the desired behavioral change. The main highlights of report on the mentioned survey are as follows:

1. The surveys were conducted on IOSCO and OCED/INEF members from December 2016 to January 2017.
2. The surveys were conducted with the objective of assessing the Incorporation Behavioral Insights applications in financial literacy and education initiatives and programmes.
3. The report seeks to identify present practices and researches that must be helpful to policy makers in designing and developing the behavioral-informed education programmes.

The present paper will follow as below mentioned parts on the basis of report contents:

Part I: Global Vision for Financial Literacy and Education with Behavior Insights for general consumer

Part II: De-biasing approaches in Behavioral Insights –literature review

Part III: Behavioral Framework applicable to design of Investor Education and financial literacy Programmes.

Part IV: Application and approaches of Behavioral Insights to Investor Education and financial literacy initiatives by IOSCO and OECD/INFE Members.

Part V: Conclusion

The report will contribute to the work done by World Bank and OECD in researches especially in field trials, significance of Behavioral Key concepts, techniques for evaluation.

Part-I: Global Vision for Financial Literacy and Education with Behavior Insights for general consumer

The need of financial literacy and financial education has been officially recognized by OECD Government through exclusive and wide-ranging project in 2002. The project has been extended further in 2008 by creation of International Network on Financial Education (INFE/OECD) with membership over 240 public Institutions around 100 Countries. Organization of Economic Co-Operation and Development (OECD) defines financial literacy as a 'Combination of awareness, Knowledge, Skill, attitude, and behavior necessary to make sound financial decisions and ultimately achieve financial well being.' In 2013, International Organization of Securities Commission (IOSCO) Board created 'A Committee on Retail Investor (C8)' with Strategic Framework for Investor Education and Literacy[3]. The strategic framework of C8 aims to posit the Investor education and financial Literacy programmes that can help the retail investor for better financial management and decision. IOSCO and OECD/INFE agreed to work jointly on this area to explore the application of BI in Financial literacy and Investor Educational initiatives.

It has been identified by OECD and IOSCO C8 that Financial Literacy programmes suffer from some limitations. It is observed through empirical behavioral researches that retail Investors are not consistent in rational decisions and suffering from biases like psychological, cognitive and social that influence their rational financial decision. The individual tends to employ heuristics and biases to simplify the financial decision making instead of access to comprehensive information[4],[5].

The Financial Literacy programmes fail to assure desired outcome like better financial decisions by consumers, regulatory intervention to achieve desired results. There is a great challenge of developing the simple effective and low cost method of Financial Literacy and educational programme inclusive of Behavioral Insights.

Behavioral Insight, according to OECD, as one discipline, along with Behavioral Science and Behavioral Economics, "which mix traditional economics strategies with the insight from psychological, cognitive sciences and other Social sciences to discover the many 'irrational' factors that influence decision making[6]". The aim of application of Behavioral Insights is to improve the consumers' decisions through policy and regulatory intervention. These interventions must be based on the empirical evidences through efficient and full proved experimental methods[7]

Though financial literacy and education initiatives focus on the welfare of investor to take accurate financial decisions with regard to saving, investment avenues, and appropriate use of credit and risk awareness, yet providing such awareness is not enough to change financial behavior of Consumers in long run. The limitation of financial literacy initiative can be explained with cognitive factors to some extent. The cognitive factors like participants may not understand the contents or may not be able to confess the need to use such knowledge or unable to retain the information due to shortcoming of methodology or techniques used in providing information.

Not only the behavioral biases that lead to bad financial decisions, but they may also affect adversely on attending the Financial educational initiatives[8]. For example, the overconfident consumers will reject the important information and tend to behave according to their beliefs[9].

The social factors are great motivator and drivers in individual decision behavior. Financial decisions like investment and spending are sometimes taken under influence of social factor like peer pressure, herd behavior and seeking a social status.

Thus the consideration for an effective financial literacy and education are cognitive factor, social factors.

For designing effective financial literacy and educational initiatives, there is need to address two approaches:

1. The programme and initiatives must contain elements of awareness along with motivation for behavioral change in Investor consciously.

2. The context and environment must be taken care of while creating such initiatives. The efforts will induce the individuals to behave in rational manner after analyzing and assessing their system 1 e.g. nudging.

The part B discusses how behavioral insights are being used to address these two approaches.

Part II: Approaches in Behavioral Insights–literature review

Since heuristics and biases are key elements that influence the rational financial decision of an individual[10]. Thus the aim focus in application of behavioral insights is to reduce such behavioral biases.

1. DE-BIASING

Under this report, Debiasing refers to action oriented intervention with an aim to reduce and mitigate the effects of behavioral biases on financial decision making. There is no explanation with regard to whether such a de-biasing strategy have impact on present or long term particular decision behavior of individuals or not. On the basis of objective of intervention, the de-biasing approach can be classified ;

A) De-Biasing Techniques Of Individuals

Under this approach, the focus is on development of decision maker through supply of knowledge. This will help the individual to analyze financial issues more effectively. Off classroom teaching methodology like simulation system[11], experimental learning helps in improving the capability of Investors by diminishing the presence of biases. Since several experiments are conducted by psychologist to test effectiveness of de-biasing strategy.

The aim of such strategies is to encourage the people to look at the situation in different way so as to overcome the narrow thinking. Under such approach the methodology is taught to decision maker to identify the different objectives and to handle each objective at a time instead of all objectives at a time. This will enable a decision maker to generate alternatives and to act effectively in decision making[10].

B) De-Biasing Techniques Based On Environment

This approach is known as ‘choice architecture’, the focus is on altering the environment and situation so that decision makers’ biases become irrelevant and enable them to opt for desired outcome. Thus interventions of Policy makers by offering economic[12] or noneconomic incentives are used to create or design the environment which may be conducive for desired outcome of rational financial decision by analyze the benefits changed environment.

Though economic and non economic incentives create conducive environment for rational financial decisions still investor need to opt or make choice related to change in his behavior.

‘Choice Architect’ and ‘Nudge’ are attractive interventions, thus focus on more automatic processes of judgment and influence “change behavior without changing the minds[13]”

Thus environment modifications (like compulsive commitment of future rise in salary towards debt reduction) enhance the chances of behavioral change. Environment modifications offered with less hassle factors help the participants to act immediately during or after the Policy making / financial literacy initiatives.

However there is huge gap in studies related to occurrence of behavioral biases and de-biasing experiments. There is a great need of scientific research related to testing de-biasing techniques and techniques to cope up behavioral biases and heuristics.

2. OTHER APPLICATIONS OF BI TO FINANCIAL LITERACY

With view to deal heuristics and biases, as per report the below mentioned techniques can be considered important for behavioral change while designing Financial Literacy programmes.

Rule of Thumb: Generally Learners incorporate ‘rule of thumb’ (based on principles and teaching fundamentals) in the decision behavior instead of traditional financial knowledge. And at the same time Chances of Procrastination and misunderstanding are less. Thus rule of Thumbs helps in tackle & reducing the chances of heuristic and behavioral biases.

Mass Media: MM is considered as powerful tool to create impact on behavioral aspects by engaging emotionally the large audience with educational content or stories. The report has evident of evaluating economic impact of financial literacy by World Bank in South Africa through using mass media i.e. Television soap Opera on Debt Management. The event was successful as viewers were less likely to engage in gamble and hire purchase agreements. Likewise In Nigeria World Bank assessed the impact on entrepreneur of a movie that encourage saving message. Though Mass media proved to reach at large audience yet has short term influence in decisions.

Visual Tools Counseling :As evident of US experiment in the report, the level of users' self-efficacy and financial knowledge[14]is considered to be higher in using of Video or interactive programmes than text based or passive educational programmes . Thus Behavioral insights also drive the use of the visual tools in financial literacy initiatives.

Financial Coaching:Though Customized coaching experiments evident to be more impactful on behavioral change than on financial Knowledge however, motivating participants to be consistent in attending coaching session remains a challenge.

Trans-theoretical Model of Change – (TTM)is a integrating psychological model for Behavioral change. The model elaborates how people modify a problem behavior or acquire a positive behavior. This model is based on assumption that behavioral change is not a discrete event rather it is a long process. The model explains stages of change: pre-contemplation, contemplation, preparation, action, maintenance and termination. The application of this model can provide a base for development of an effective and impactful intervention and financial literacy initiatives. It is evident through a survey showing that most of financial distressed people are on pre-contemplation stage[15] which means people may not be aware of problem or probable have no intention to alter their behavior. The application of the model for Personal Finance management suggests that it might be more effective to first to teach 'an avoidance strategy[16]' to limit impulsive purchases among individuals, before bringing an 'approach strategy' of saving among the individuals.

3. BEHAVIORAL SCIENCES RESEARCH FINDINGS WITH PROSPECTIVE APPLICATIONS IN FINANCIAL EDUCATIONAL INITIATIVES

The report discusses two selected psychological theories i.e. Theory of Planned Behavior and Financial Socialization. The theories study various factors and variables that have potential of influencing or eventually changing the financial behavior.

According to The Theory of Planned Behavior(TPB)[17] the Intention of an individual determines his/her behavior and three factors that influence intention are attitudes, subjective norms and perceived behavioral controls. The theory explained the young adult's perceived behavioral control was one of the factors that are related to their financial wellbeing [18].

Through family socialization theory, it is suggested that Family financial socialization is one of the key element that affecting financial behavior throughout the life of an individual. Thus it is very important to incorporate the element of involving the families as participants in the financial literacy initiatives.

The report focus to analyze relationship of the personality framework with financial behavior through 'Five Factor Model'/ Big Five Inventory i.e. already applied in an investor education campaign[19]. Though the personality traits measures are helpful in designing the financial literacy programmes for target audience on the basis of personalities for effectiveness, yet there is extensive research is required to investigate the casual relationship between traits and financial behavior.

Part III: Behavioral Framework applicable to design of Investor Education and financial literacy Programme

To develop an effective intervention for desirable Financial Behavior change, there is a need to have frameworks by Behavioral Sciences. Though researchers have identify and analyze 19 Frameworks of Behavioral change Intervention yet the present report focus on only those framework which are employed by IOSCO and OECD/INFE members.

- 1. COM-B:** refers to Capability, Opportunity, and Motivation- Behavior (COM-B) system proposed by Michie et.al(2011) . This Behavioral system consists of three factors i.e. Capability, Opportunity and Motivation. These factors interact to generate Behavior. The Exhibit.1[20] shows single and double-headed arrows that indicate the potential influence between system components.

While observing the challenges existing in the literature of financial capability, the system permits to believe that psychological factors might have more influence than the knowledge or awareness in Financial decision behavior.

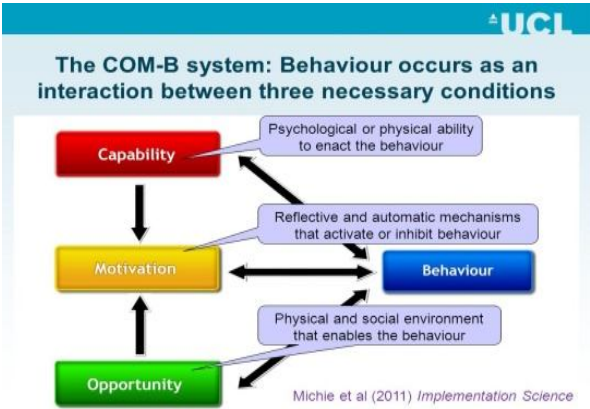


Exhibit-1: The COM-B System²⁰

2. BCM: The Behavioral Change Wheel:As shown in Exhibit: 2[21]it is three layer behavioral framework developed from 19 frameworks of Behavioral Change that are identified in literature review.

-In the inner most layer, the COM-B framework is used that explains the Behavior occurs as an interaction between three necessary conditions.

-The middle layer consist of nine types of Interventions needed to put the system into new configuration with the minimum risk of it reverting

-the outer most rim of the wheel consists of seven policy categories to support the delivery of intervention with aim of achieving the desired financial Behavior Change.

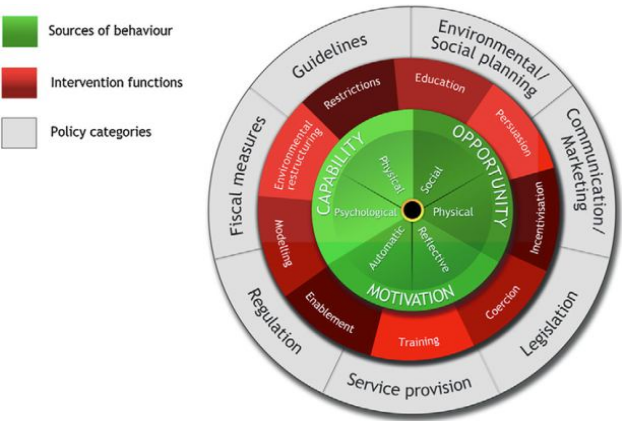


Exhibit-2: Showing the BCW Framework

3. MINDSPACE: The framework provides nine-coercive approaches to understand the behavior of Individuals.

Messenger	We are heavily influenced by who communicates information
Incentives	Our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
Norms	We are strongly influenced by what others do
Defaults	We 'go with the flow' of pre-set options
Salience	Our attention is drawn to what is novel and seems relevant to us
Priming	Our acts are often influenced by subconscious cues
Affect	Our emotional associations can powerfully shape our actions
Commitments	We seek to be consistent with our public promises, and reciprocate acts
Ego	We act in ways that make us feel better about ourselves

Exhibit-3: The MIINDSPACE Framework [23]

The “4Es” MINDSPACE Application Framework provides policy tools to bring change in Behavior shown in Exhibit 4.

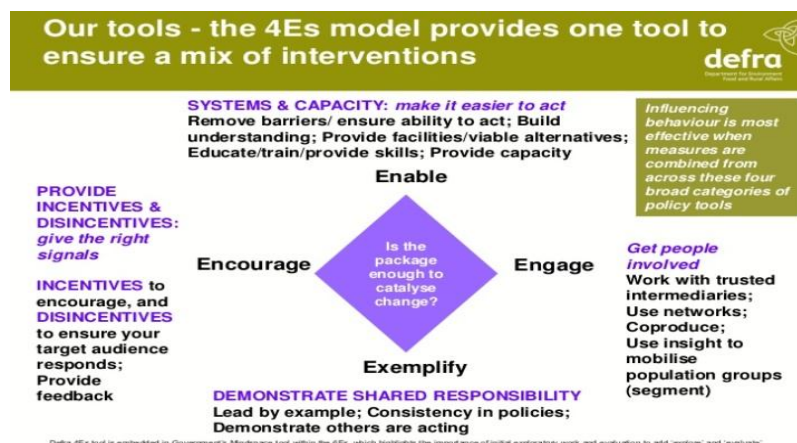


Exhibit-4: 4E MINDSPACE Application Framework[23]

EAST: The EAST ‘Easy, Attractive, Social, and Timely, Framework created by BIT (Behavioral Insights Team) in 2012 to provide simpler Model to the policymakers that incorporate the insights missing in MINDSPACE. The policymaker should create an intervention with use the framework based on four principles(mentioned below) to encourage a certain type of Behavior as :

- **Make it Easy**

Tie together the supremacy of defaults.

Decrease the ‘hassle factor’ of taking up a service

-make simpler messages.

- **Make it Simple**

Create a center of attention.

Propose rewards and sanctions for utmost result.

- **Make it Social**

Confirm that the majority people do the desired behavior.

Make use of the power of networks.

Persuade people to make a obligation to others

- **Make it Timely**

Timely inhabitants when they are likely to be most interested.

Quick populace when they are likely to be most accessible.

Facilitate people plan their reaction to events

The four stages method is recommended to apply EAST by BIT

1. Define the target / desired Behavior
2. Analyze the Context from environment and people prospective.
3. Design and review the effective intervention
4. analysis, Learn and accustom
5. **TEST Framework:** The TEST Framework “Target, Explore, Solution and Trial” developed by BIT in 2016 with aim to explore the development and implementation of trials. Whereas EAST was created to develop an intervention.
6. **Design for Behavioral Change (CREATE):** The Framework based on ideology of applying improved design technology to build up innovative investor Education and financial literacy product initiatives with a view to change Financial Behavior. As shown in Exhibit 5, Design process involves the needed skill. The Financial behavior can be analyzed by Data analysis and further to define evaluation metrics. The Product development and Users’ experience techniques helpful in stimulating product use.



Exhibit-5: Needed Skills For the Design For Behavior Change[24]

The Framework for Behavioral Change Involves four steps that are Understand, Discover, Design and Refine as shown in exhibit 6

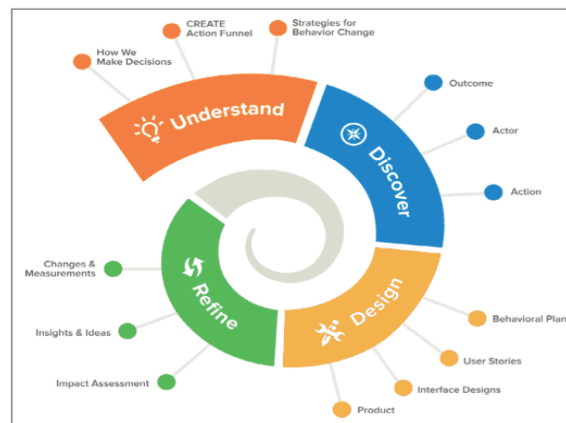


Exhibit-6: Framework of Design for Behavioral Change[25]

The framework explained that Behavior change process have five stages (as shown in Exhibit 7). The funnel describes the distraction of audience that can be used to detect and correct the design flaws in the programmes and Initiatives. Thus Framework manual explains strategies that encourage the participation and avoid leakage.



Exhibit-7: CREATE and Generalized Conversion Funnel[25]

7. Conceptual Framework for financial Behavior Change with educational strategies

With aim to support design and evaluation of financial literacy initiative, the three different theories are combined by two academicians in 2010. The elements of Framework are from: TTM Tran- theoretical Model of Behavior change, Targeting Outcomes of Programmes Model, Ecological system Theory and Diffusion Theory.

Part IV. Application and approaches of Behavioral Insights to Investor Education and financial literacy initiatives among IOSCO and OECD/INFE Members

A) Survey Result on Application Behavioral Insights by IOSCO and OCED/INFE members

The two survey was conducted by IOSCO and OCED/INFE on resources committed by their members , their experience towards application of Behavioral Insights in their Initiatives. From Dec. 2016 to September 2017, 59 members of IOSCO representing 49 Jurisdictions & 34 member of OCED/INFE from 30 countries replied for surveys.

Though 11 members from OCED/INFE also participated in IOSCO - C8 Survey and reflected their response for both Financial Literacy and Investor Education in their jurisdiction, yet their reponse was counted only once.

The majority of the respondents reported that they are actively learning through the existing information resources i.e. existing literature, events workshop and networks. The observation are:

- Approximately half of respondent members reported to dedicate resources doe training research and application of behavioral insights in either financial literacy or Investor education or both.
- 1/3 of respondent members reported that they have active participation in seeking or gaining application insight. Five respondents reported that they are using framework like COM-B, MINDSPACE, and EAST for the application of BI in Financial literacy Initiatives.
- A few of respondents reported of using approaches by utilizing the behavioral elements.
- The respondents highlighted the tools like use of online resources, face to face interaction, developing social skill and financial decision making techniques with objective of enhancing financial literacy level.
- Many respondents are working on consumer behavior through qualitative and quantitative research for testing prototypes in designing effective educational tools.
- Some are using random control trials and some are using choice architect intervention for testing the consumer behavior in controlled environment.

C) **Approaches** : The approaches to taken into consideration about behavioral insight and their possible application for designing the financial literacy and investor education initiatives and programs in general are:

1. Set up actual Understanding of the problem
2. Plan the intervention taking the context into account.
3. Initiate small
4. Appraise thoroughly
5. Interact, learn, and keep track
6. Build thought leadership
7. Consider combining traditional approaches and those based behavioral insight
8. Review programmes/initiatives regularly

CONCLUSION

The Impactful Investor education and financial literacy programs with behavioral insight enable Individuals efficient in taking financial decision. Behavioral Sciences have focus on identifying the barriers in behavior change.

It is believed by members of IOSCO and OECD/INEF that the keys to develop deeper understanding of Individual behavior are sharing knowledge and experience as well as collaborations. The report will be very helpful in policy decisions related development and implementation of effective Investor education and financial literacy initiatives. the result of complementary surveys on IOSCO and OCED/INEF related to extent of usage of Behavior insights in financial literacy and investor education initiatives by their members, resources committed for application of BI by their members, literature review related relevance of BI & their application , identifying theories and techniques as potential tool

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EMPIRICAL ANALYSIS OF THE BITCOIN ALLURE

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ABSTRACT

The study seeks to assess the features of cryptocurrency which has captured the imagination of many. The main focus of the study is to examine the major determinants of bitcoin price. Bitcoin skyrocketed to \$19289.97 on December 2017. Time series data has been collected from 2009-2017. Econometric model of Augmented Dickey Fuller test has been used to test the stationarity condition of the time series data. Granger-Causality test has been used to determine the presence of lead lag relationship between the variables. The findings reveal that the size of bitcoin economy is the prime cause of volatility in bitcoin price. Though the future of cryptocurrency is still uncertain due to the possible risks attached to it, but the block chain mechanism if adopted by the banks and other mediums will smoothen the transaction process.

Keywords: Bitcoin, Cryptocurrency, Blockchain, Granger-Causality, Augmented Dicky Fuller.

INTRODUCTION

Cryptocurrencies have become a global phenomenon and has captured the imagination of speculators, computer geeks and governments across the world. They have become the topic of debate amongst public media and scientific community. Many cryptocurrencies are floated in the market, like, Bitcoin, Litecoin, Namecoin, Swiftcoin, Ripple, Peercoin, Ethereum etc. but the digital currency that has garnered success is bitcoins. Bitcoin is defined as a chain of digital signatures which is supported by a decentralized network of users. These signatures contain historical information about the holder of bitcoin to authenticate the transaction and its transfer. It is the first virtual currency to be introduced in 2008 by Satoshi Nakamoto and the first to use the concept of cryptography as a means to make payment for various needs. Cryptography enables a user to sign cryptographically and transfer value using public and private keys (Financial Action Task Force, 2014). The fluctuations in price of bitcoins have been tremendous, on January 2011, one bitcoin was trading at \$0.3 against US dollar and touched a high of \$19289.79 on December 2017. Unlike the central bank of a country issues paper currency, a bitcoin is generated by data mining. This process of generating bitcoins by creating new blocks with the help of software is known as bitcoin mining. Unlike fiat currencies like US dollar and Euro are denoted as EUR or USD etc. bitcoins are symbolised as BTC and circulated in three denominations of 1BTC, 5 BTC and 25 BTC. Each bitcoin is subdivided into 100 million smaller units called 'Satoshis', defined by eight decimal places (Nakamoto, 2008). Contrary to fiat currencies whose value is derived from the trust underwritten by the state, bitcoins value is determined by the demand and supply amongst the people willing to trade in it. Thousands of computers indulged in solving complex algorithms that are used to unravel the problem. The reward for solving the algorithm is a newly minted bitcoin (Kaplanov, 2012).

These freshly minted bitcoins are stored in user's wallet which consists of a public key and a private key. Public key acts like the address of the person to whom bitcoins can be transferred and private key facilitates transfer of bitcoins from the owner to another individual. To ensure the validity of the transaction and avoid double spending of the virtual currency, Satoshi Nakamoto coined the idea of peer-to-peer technology. Bitcoins use this peer-to-peer technology to keep record of all the transactions that have taken place. (Turpin, 2014). This peer-to-peer technology uses the concept of blockchain which is a distributed network that records transactions to ensure authenticity of the bitcoins that have been transferred. Each transaction is recorded over network but the identities of the parties to transaction are not disclosed. Secure trade and anonymity provided by bitcoins has enabled bitcoin users to trade them digitally. Ease of transaction, absence of any central authority, low cost of transaction and anonymity provided by bitcoins has been the prime driver of the increase in the demand and price of bitcoins (Morawczynski & Pickens, 2009). (Barber, 2012) (Bryans and Yermack 2014) explained that the anonymity and transparency provided by bitcoins and its distributed architecture has been another reason of bitcoins growing popularity. (Luther and White 2014) propounded that, the absence of central clearing and settlement node has increased the demand of bitcoins compared to debit and credit cards. The exchange fee charged by central clearing authorities for transfer of bitcoin is quite low in comparison to the traditional means of money transfer. Another key driver of bitcoin craze is it being limited in number. Only 21 million of bitcoins are available and to generate one bitcoin, miners have to indulge in complex data mining. At the time of conducting this study approximately 16.83 million of bitcoins have been mined having a market capitalization of \$192.7 billion (Blockchain.info). The increased use of bitcoins as a medium of exchange has gained popularity due to their decentralized nature, as they are not monitored by any regulating authority. Blockchain

technology adopted to mine bitcoins makes it difficult to counterfeit them as any new block that has been introduced has to be vetted by others to allow that particular block to be added with other blocks. This blockchain technology adopted by bitcoin has further enhanced its appeal and all other cryptocurrencies. To include a new block into the chain all the participants jointly validate a block and once it has been validated by all nodes a new block is included to blockchain (Baron et al. 2015). The fees involved in remitting money through traditional means like cheques, cards or PayPal is more as companies exploit users by charging exorbitant amount of money for transaction purposes. (Folkinshteyn et al., 2015) argued that blockchain technology adopted by bitcoins is the prime reason of its increasing demand as it is used for remittances. Money can be transferred from one party to another at low transaction cost, all a person needs is a computer with internet and money can be transferred in a few minutes. The transfer mechanism is similar to sending e-mails by one person to another. (Grinberg, 2011 and Hayes, 2014) defined blockchain as a technology which records all transactions via a decentralized public ledger. The transactions are verified and validated by all individuals or companies that run software to ensure their integrity and prevent any addition of any unauthorised transaction. Many criticized cryptocurrencies as it feared the risk of double spending or counterfeit. This problem of double spending or counterfeit is solved by blockchain technology. As all transactions gets recorded in public ledger which can be verified by anyone and everyone.

Bitcoins can be obtained in primarily three ways- they can be mined by individuals who solve complex algorithm and in return they get bitcoins as rewards. Those who cannot mine a bitcoin can also get hold of this virtual currency by purchasing it from an exchange trading bitcoins. These days many exchanges are indulged in buying and selling of cryptocurrency. CME the world's largest exchange acknowledged the demand of bitcoins and introduced bitcoin futures. Coin.ph which uses blockchain technology entered into partnership with Security Bank which allows the users of Coin.ph to withdraw cash or purchase bitcoins by depositing money into any of the 450 ATMs that have been installed by them (Young, 2015). Bitcoins can be exchange for US dollar, euro or other fiat currencies (Financial Action Task Force, 2014). An individual can get hold of bitcoins by undergoing a sale of goods and services which are denominated in bitcoins. Acceptance of payments in bitcoins by businesses like Reddit and Wordpress has encouraged the use of bitcoins.

Though bitcoins are gaining traction but scepticism about the currency's legality and definition has kept many vary of indulging in the bitcoin craze. (Velde, 2013, Hanley, 2014, Yermack, 2014 and Williams 2014) have defined bitcoins as speculative investment rather than real currency. Contrary to them, studies by (Plassaras, 2013, Satran, 2013, Luther and White, 2014, Folkinshteyn et. al, 2015) have identified bitcoin as a virtual currency. Also, bitcoins have been granted the status of a virtual currency by Financial Crimes Enforcement Network (FINCEN, 2013), European banking authority and European Central Bank (European Banking Authority, 2014). However, Internal Revenue Service of USA have acknowledged bitcoins as a property. IRA regulated that bitcoins and all virtual currencies will be taxed as property (Michael, 2014). (FINCEN, 2013) however cautioned about bitcoins use as a "real" currency, as virtual currencies are yet to get the legal tender status by countries.

Another feature that has led to the popularity of bitcoins is the irreversible nature of the transactions. Accidental or an unwanted purchase can be reversed for transactions made via credit and debit cards but it is not possible to reverse such kind of transactions through bitcoins (Böhme et al. 2015).

Bitcoins have become a de facto standard as 90 per cent of the market capitalization of cryptocurrencies consists of bitcoins (Swan, 2015). Thus, bitcoin being the most successful of all cryptocurrencies the research majorly looks to symbolize bitcoins for other cryptocurrencies as well. Bitcoin and cryptocurrency has been used interchangeably in the study.

Table 1 present a summary of the bitcoin allure:

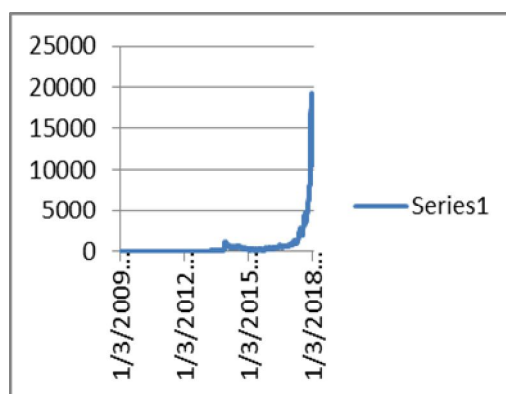
Table-1: Data on Bitcoin Activity (Till January, 2018)

Number of bitcoins mined	16820025
Market price of Bitcoin	\$11697.40
Total number of transactions	295608699
Number of wallet users	22454275
Hash rate	19491456 TH/s
Blockchain size	153681 MB
Estimated daily transaction value	\$2822337880
Unique Addresses	574420

Source: Blockchain.info

RELEVANCE OF THE STUDY

The present study attempts to assess the potential factors that have caused tremendous volatility in bitcoin prices. The price of bitcoin skyrocketed from \$0.3 in 2010 to \$19289 in 2017 and has experienced multiple peaks until 2017. At the time of conducting the research, bitcoins are trading at \$11138.97 against US dollar. At first, an overview of literature of previous studies has been conducted which have explained the drivers for bitcoin price volatility. Few researchers have categorized cryptocurrencies as a means of speculative investment and some have advocated over the strong potential of cryptocurrencies. Based on studies of (Buchholz et al., 2012), (Palombizio and Morris 2012), (Luther and White, 2014), (Böhme et al. 2015) current study has identified the variables that might explain the extreme volatility in bitcoin prices. The data on number of bitcoins in supply, size of bitcoin economy, global macroeconomic, financial and technical indicators will be analysed. To determine the impact of global macroeconomic and financial factors data will be collected on changes in price of oil and Dow Jones and Hash rate to estimate the impact of technical indicators. Time series data will be collected from 2009-2017. The study also looks to assess the blockchain mechanism and its growing popularity for various transaction purposes.



Source Blockchain.info

REVIEW OF LITERATURE

First contribution of the study has been to identify the fundamental reasons for the tremendous rise in price of bitcoins. For this purpose, the research has conducted review of the previous studies and defined the variables undertaken.

Price of Bitcoin

Bitcoin is defined as a chain of digital signatures which is supported by a decentralized network of users (Turpin, 2014). Supply and demand of bitcoin determines the currency's real value (Kaplanov, 2012).

Bitcoin Supply and Demand

(Buchholz et al., 2012) stressed on the limited supply of bitcoin as a key driver for run up against US dollar. (Luther and White, 2014) have explained that bitcoins derive their value from the market forces of demand and supply. Being limited in number any increase or decrease in demand of bitcoin will eventually lead to an increase or decrease in its value against dollar. (Ciaian et al., 2016) applied quantity theory of money and explained that the size of bitcoin economy, velocity of bitcoin circulation and total stock of bitcoins in circulation denoted the demand and supply of bitcoins. The quantity theory exemplified that the size of bitcoin economy and general price level led to an increase and velocity and stock of bitcoins led to a decrease in the price of bitcoins.

Global macroeconomic, financial and technical indicators

(Palombizio and Morris 2012) explained the exchange rate movement through changes in price of oil. An increase in price of oil causes a downward pressure on currency and a decline in oil price causes an appreciation in currency thus impacting exchange rate system. Similarly, if bitcoins are used as a medium of exchange then a significant change in oil price will cause an appreciation or depreciation of cryptocurrency. (Kristoufek, 2014) explained the presence of a positive relation between bitcoin prices and hash rate.

RESEARCH METHODOLOGY

Model Specification

To estimate the influence of factors defined in our literature review, we have specified the following bitcoin price equation

$$p_t^B = \beta_0 + \beta_1 y_t + \beta_2 b_t + \beta_3 m_t + \epsilon_t$$

t is the time subscript, Bitcoin price which is estimated against US dollar is represented with ptB, the size of bitcoin economy is denoted by yt, it has been used as a proxy variable to include the number of unique bitcoin address and the number of bitcoin transactions per day, bt is the number of bitcoins in circulation which is captured through the number of bitcoins that have been mined, mt is used to summarize the macroeconomic, financial and technical indicators and et is the error term.

For time series data to be effective first condition is to check for the condition of unit root. If data has unit root it means the data is non-stationary which will lead to spurious results. In order to avoid spurious results testing of unit root in model is important. Augmented Dickey-Fuller (ADF) test has been used to check presence of stationarity in the data.

Panel co-integration has been used to provide evidence of integration amongst the variables. Granger-Causality test will be used to determine the presence of lead lag relationship between bitcoin prices, bitcoin economy, bitcoin in circulation and macroeconomic, financial and technical indicators.

Data collection and construction

The study seeks to analyse the factors responsible for volatility in prices of bitcoins. For this, bitcoin price has been defined as the dependent variable. The data on bitcoin price has been taken as the value of bitcoin against US dollar which has been extracted from blockchain.info. The independent variables have been defined which explain the factors that might have a considerable impact on bitcoin price movement. To represent the number of bitcoins in circulation, we have undertaken the data on total number of bitcoins that have been mined. Total number of unique address of bitcoins and number of transactions per day have been proxied to represent the size of bitcoin economy. The data on all independent variables has been taken from blockchain.info. To estimate the influence of global macroeconomic, financial and technical indicators, study has included the US Dow Jones index (data for Dow Jones has been taken from US Federal Research Bank, St. Louis) and prices of oil (has been taken from US Energy Information Administration). To estimate the impact of technical indicators we have taken data on Hash rate (extracted from blockchain.info) to determine it influence on bitcoin prices.

DATA ANALYSIS AND INTERPRETATIONS

The study has incorporated panel data on factors influencing bitcoin prices. The variables that have been analysed as the supply and demand determinants of bitcoin price movement are number of bitcoins mined, number of transactions and unique address of bitcoins miners. To estimate the impact of global macroeconomic, financial and technical factors study has analysed Dow Jones stock index, global prices of oil and Hash rate of bitcoin mining. Panel data for five variables has been collected from 2009-2017 to determine the bitcoin price drivers.

Augmented Dickey Fuller test has been used to test the stationarity condition in our time series data. To ensure data is stationary or non-stationary we check the value of Durbin Watson Statistics. Value of Durbin Watson statistics when more than or near to 2 ensure that there is no autocorrelation amongst our residuals and the test applied is a reliable measure. Further, to attest to stationarity in data we compare the negative value of ADF with the negative critical value and when negative ADF value is less than the negative critical value, then the said series is said to fulfil the condition of stationarity. However, if the ADF value is more than the negative critical value then the said data is non-stationary. Results of ADF which analyses the presence of unit root have been reported in table 2-7. Table 2 depicts, Log_Market price fulfills the condition of stationarity at level, implying rejection of null hypothesis and stating the series as stationary. Table 3 illustrates the result of unit root test and show that Log_Bitcoin economy satisfies the condition of stationarity at second differencing using ADF test. Table 4 demonstrates the Log_Stock of bitcoin has met the condition of stationarity and therefore, rejection of null hypothesis at second difference value of ADF test. Table 5 shows that Log_Dow Jones satisfies the condition of stationarity at difference 1 of ADF test. Table 6 indicates the Log_Oil price is stationary at level. Table 7 shows Log_Hash Rate rejecting the null hypothesis at second difference value of ADF test.

Table-2

	ADF(0)	ADF(1)	ADF(2)
Intercept only			
Log_Market Price	-3.213551	-5.716846	5.721227
Akaike Info Criterion	1.775300	2.204813	2.573742
Schwarz Criterion	1.752119	2.189359	2.504329
Durbin Watson Stat	1.972470	1.146834	1.582238
Probability	0.2657	0.0035	0.0011
Test Critical Value			

1%	-4.803492
5%	-3.403313
10%	-2.841819

Table-3

	ADF(0)	ADF(1)	ADF(2)
Intercept only			
Log_Bitcoin Economy	10.65628	-13.84968	10.13692
Akaike Info Criterion	-2.187509	-3.616561	-2.854769
Schwarz Criterion	-2.210690	-3.720681	-3.089106

Durbin Watson Stat	0.926602	2.079832	2.113632
Probability	0.0001	0.0001	0.0424
Test Critical Value			
1%	-5.604618		
5%	-3.694851		
10%	-2.982813		

Table-4

	ADF(0)	ADF(1)	ADF(2)
Intercept only			
Log_Stock of Bitcoin	-2.496741	-3.048630	11.13255
Akaike Info Criterion	1.570497	1.442466	-2.853022
Schwarz Criterion	1.547316	1.427011	-3.165471
Durbin Watson Stat	1.541477	1.621301	2.765467
Probability	0.7454	0.0070	0.0005
Test Critical Value			
1%	-8.235570		
5%	-5.338346		
10%	-4.187634		

Table-5

	ADF(0)	ADF(1)	ADF(2)
Trend and intercept			
Log_Dow Jones	16.77005	15.02878	11.41199
Akaike Info Criterion	-3.934300	-3.676259	-2.803996
Schwarz Criterion	-3.957481	-3.815086	-2.908116
Durbin Watson Stat	2.457824	2.869610	2.001413
Probability	0.6304	0.4379	0.4615
Test Critical Value			
1%	-7.006336		
5%	-4.773194		
10%	-3.877714		

Table-6

Dependent	tau-statistic	Prob*	Z-statistic	Prob*
DOW	-3.294508	0.6810	-45.73745	0.9999
ECONOMY	-4.893656	0.2739	471.9089	0.0001
HR	-2.457212	0.9125	-7.980622	0.8605
MINED	-3.138180	0.7309	-26.77954	0.9999
MP	-2.996842	0.7721	-26.56522	0.9999
OILPRICE	-2.998198	0.7717	-32.47005	0.9999

Table-7

	ADF(0)	ADF(1)	ADF(2)
Intercept only			
Log_Oil price	7.199858	5.457842	11.25242
Akaike Info Criterion	-1.199959	-0.987955	-3.300967
Schwarz Criterion	-1.223141	-1.003409	-3.535305
Durbin Watson Stat	2.380361	1.846951	1.180263
Probability	0.4297	0.3219	0.0004
Test Critical Value			
1%	-4.803492		
5%	-3.403313		
10%	-2.841819		

Table 8

	ADF(0)	ADF(1)	ADF(2)
Intercept only			
Log_HashRate	-14.05496	-6.984415	-6.871058
Akaike Info Criterion	4.013740	2.566976	2.957019
Schwarz Criterion	4.033600	2.551521	2.887606
Durbin Watson Stat	1.937531	1.246029	1.968442
Probability	0.8844	0.0014	0.0008
Test Critical Value			
1%	-4.582648		
5%	-3.320969		
10%	-2.801384		

Panel Cointegration

Panel Cointegration test is used to check whether the stationary series is cointegrated with each other or not. To estimate the cointegration in the series we check the probability value of all the variables. The probability value or the p value if less than 0.05 leads to rejection of null hypothesis implying cointegration exists between the variables. Table 8, shows the result of panel cointegration which highlights that there exists no cointegration between Dow Jones and bitcoin price. Absence of cointegration between Hash rate and oil price is also seen in the study.

Granger Causality

Table-9

Null Hypothesis	F-Statistic	Prob.
Hash Rate does not Granger Cause Economy	52.5908	0.0187
Economy does not Granger Cause hash rate	3.54093	0.2202
Mined does not Granger Cause economy	2.63739	0.2749
Economy does not Granger Cause mined	31.6341	0.0306
Bitcoin price does not Granger Cause hash rate	60.6159	0.0162
Hash rate does not Granger Cause bitcoin price	4.89580	0.1696
Bitcoin price does not Granger Cause mined	23.8774	0.0402
Mined does not Granger Cause bitcoin price	0.69045	0.5916

Table 9 shows the result of Granger-Causality test. The p value of hash rate is less than 0.05 which shows that there is statistical significant relationship between hash rate and bitcoin economy and hash rate causes changes in bitcoin economy. There exists univariate granger causality between hash rate and bitcoin economy. Also, one way Granger causality is seen between bitcoin prices hash rate implying change in bitcoin prices does cause a change in hash rate. However, Hash rate does not Granger cause bitcoin price movement.

CONCLUSION AND POLICY IMPLICATION

The study has analysed the determinants which are responsible for the surge in bitcoin price. The rise in bitcoin prices has been phenomenal from \$0.3 to \$19289. There have been tremendous fluctuations in bitcoin price movement owing to the lack of clarity regarding the global acceptance of the currency. The paper has tried to analyse the price formation of bitcoin and the factors influencing. The empirical results confirm that bitcoin supply factor like bitcoin economy has a significant influence on bitcoin price economy. It was also observed

that the size of bitcoin economy did cause a change in the number of unique bitcoin address and number of bitcoin transactions per day. However, our findings do not confirm with the previous studies and exhibit that the global macroeconomic, financial and technical indicators do not influence the price movement in bitcoin. Contradicting the studies in past, it was observed that the number of bitcoins mined do not influence the bitcoin price movement. This implies that bitcoins are merely held for speculative purposes rather than gaining popularity as a medium of exchange or being accepted as a global currency. Bitcoin seems to lose heat and public trust as the potential virtual currency, after it experienced sharp decline from \$19289 to \$11138.98 from December 2017 to January 2018. Further, news about various frauds at the exchanges trading bitcoin has further clouded the future of virtual currencies. The risk of theft or loss of private key to access the bitcoin wallet is another challenge due to which bitcoin has failed to get acceptance as global currency. Therefore, the present study is not in agreement with the previous studies that bitcoin can be accepted as a global currency. Also, the price formation of bitcoin is only determined by number of bitcoins mined and not by other global macroeconomic, financial and technical indicators. Thereby, implying bitcoin is a speculative instrument which is losing its sheen due to rise of other popular investments.

The biggest advantage of bitcoins has been its use as an instrument for remittance at cheaper price. Rise of bitcoins has paved way for blockchain technology which has opened avenues in remittance, property transfer, health record storage, contracts etc. The concept of blockchain has enabled many to transfer money from one country to another at a much cheaper rate. Unlike, remittance via a third party which is usually a bank or a financial intermediary is expensive. Blockchain enables to transfer fast and cheap as it eliminates the middleman and maintain a public decentralised ledger which keeps record of all the transactions that take place. Many companies whose sole purpose is to assist in remittance exploit the common man by charging exorbitant fees to facilitate an ordinary financial transaction. With the advent of blockchain users can transfer funds at a much cheaper fees and fast time. Therefore, even if the bitcoin allure fades after sometime the blockchain technology that has been introduced has a huge potential. If exploited properly, blockchain technology will open new avenues to people by eliminating the costly financial regulations and further strengthening financial inclusion.

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DEMONETIZATION AND DIGITAL PAYMENT SYSTEM IN INDIA

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ABSTRACT

The computerized installment changed the purchasing conduct of Indian culture. It prevents dark currency showcase. It encourages the administration to keep up a record of all exchange. Advanced Payment Habit has changed after demonetization. Individuals have no other alternative for exchange so Indian culture move gradually from money to computerized exchange framework. On the prior, when advanced installment acquaint individuals falter with change their exchange propensities however after demonetization, they power to do their exchange with computerized installment. This paper looks at the impact that Demonetization has had on the various payment methods in India. Specifically, it aims to see how the various digital platforms have evolved with the advent of demonetization.

Keywords: Demonetization, Digital payment system.

INTRODUCTION

At 8 PM on November 8, 2016, P.M. Modi declared that money notes of 500 and 1000 sections will never again be substantial past the midnight, in this way pulling back 86% of trade out flow at that time. The individuals who were in control of invalid notes were requested to store them into banks by December 30, 2016. The activity, known as "demonetization", was at first said to be pointed towards checking dark cash. Through this process, individuals having unlawful wage in real money were anticipated that would be compelled to uncover them or surrender the money to abstain from being indicted. At last, 99% of the money returned into the managing an account framework, as indicated by the yearly Report distributed by the RBI. The cash crunch faced by the people incentivized them to shift to digital payment methods such as mobile and internet banking, m-wallets and UPI.

People in India are still wary about using technology for making payments. The younger, more cosmopolitan generation is becoming familiar and comfortable with the digital lifestyles. People from rural areas and the senior citizens still have their doubts. Also, many of them do not know how to operate through online platforms.

LITERATURE REVIEW

Annamalai, S. and Muthu R. Iiakkuvan (2008) in their article "Retail transaction: Future bright for plastic money" projected the growth of debit and credit cards in the retail transactions. They also mentioned the growth factors, which leads to its popularity, important constraints faced by banks and summarized with bright future and scope of plastic money.

Jain, P.M (2006) in the article "E-payments and e-banking" opined that e- payments will be able to check black"An Analysis of Growth Pattern of Cashless Transaction System. Banks, financial institutions, business and common citizens can optimally use the available funds with the help of technology, quick payments and remittances.

Chandra Shekhar Ghosh (2017) in his article "DEMONETIZATION", A Boon or Bane for the Indian Economy. He mentioned that demonetization has improved banking system and led to greater financialisation of savings, people will shift their focus from real estate to financial assets such as mutual funds, insurance, among others, as an investment avenue. "We cannot avoid short-term pains for long-term gains".

Dr.Sweta Singhal (2017) in her article, " Demonetization and E-banking in India", She was of the opinion that, with the introduction of smart phones and mobiles application the usage rate has increased, But there is a long way to go as rural population of India is still waiting for some program from banks that will facilitate their usage of -banking services.

Nancy Prajapati and Sanjeev kumar Singh (2017), In their study they concluded that there is a flood in the demand of online and other digital modes of payments during demonetization because of great shortage of liquidity in banks. Different Banks have launch and promote different apps for easy online transactions like SBI has launched UBI app for mobile banking.

Dr. K.Sreelatha Reddy and Ms. S.Jayalaxmi, in their article "Demonetization–Transformation to Digital India", have explained that customers prefer online banking for faster services and ease of use. They also opined that , if the banks improve key issues of privacy of customers' information, the dream of transformation to digital India may materialize in forth coming period.

Kumar.R (2017) analyzed that demonetization step was a huge step taken by Indian government because around 87% of currency notes were of 500 and 1000 and economy fallen down at that stage because of shortage of currency as major part of our economy heavily dependent upon cash as a result country have faced problem of short of cash. The mainly research conducted on the effects of demonetization on Bombay stock exchange during this phase and the collected data has been analyzed for the window period of -15 to +15 from the announcement of the date. The major findings of the study that cash dependent and consumption based sectors were negatively affected while the financial sector was in benefit.

Anil I Ramdurg, Dr. Basavaraj CS(2016) in their article "Demonetization: Redefining Indian economy", concluded that demonetization includes the efforts towards popularizing E-banking and E-commerce.

Manpreet kaur (2017) in her article, "Demonetization: impact on cashless payment system", analyzed that online transaction system is the need of today's society. The cashless payment system is safer and better than the cash transaction system.

Seema Rathi in her study analyzed that there are some problems for public to use digital payment system but Government can create awareness and provide necessary infrastructure to make it possible for public to adopt digital system of payments.

OBJECTIVES OF THE STUDY

- To examine the impact of demonetization on online and digital banking.
- To analyze the demonetizations post effects.

METHODOLOGY

The present study is focused on analyzing the impact of demonetization on digital banking system of country. The study considers secondary data which have been extracted from various official websites, journals, articles, books and newspapers etc.

JOURNEY FROM DEMONETIZATION TO DIGITALIZATION

Demonetization in India before November, 2016. The act of demonetization 2016 is not happening for the first time in India, but before it, has happened twice, first in the year of 1946 and then in the year of 1978.

In January 1946, Rs1,000 and Rs10,000 banknotes were withdrawn but the same Rs1,000, Rs5,000 and Rs10,000 notes were reintroduced in 1954, and were again demonetized in January 1978.

The second demonetization has taken place in the year of 1978 by the Janata Party government. It had decided to withdraw Rs1,000, Rs5,000 and Rs10,000 notes by issuing an ordinance on the morning of 16 January that year.

What happened on Demonetization (NOV,2016). On 8th November 2016, Government of India had announced that from today onward rupees 500 and 1000 rupee note will not be a legal tender. This means that 500 and 1000 rupee note will be accepted by anyone except the organization declared by government.

OBJECTIVES OF DEMONETIZATION

The main objectives of demonetization are:

1. To eradicate black money
2. To remove counterfeit currency
3. To fight against terrorism
4. To stop money laundering activities
5. To mitigate corruption and so on.

The government of India has launched the campaign for Digital India to ensure that services are made available to citizens electronically by better online infrastructure and connectivity, that is, digital empowerment. It has encouraged many people to use other e-delivery banking channels for Internet banking—retail, corporate, or mobile banking; UPI; USSD–NUUP; *99# as well as e-wallet banking. Mehta et al. (2016) said over the last 2 years that while the number of Jan Dhan accounts had recorded a stellar growth, the share of these accounts in total deposit base of the banking system had remained under 1%. The demonetization drive of higher-denominated notes should give a push to cash deposits in Jan Dhan accounts, of which close to 43% so far have remained dormant.

From April 1994 to June 2016, the currency has shown a yearly growth rate of 17%, while the share of bank currency has remained around 5%. It was estimated that, for 2009–2010, RBI incurred an annual cost of INR 2,800 crore for printing currency notes as stated by Das and Agarwal (2010). Digital money is safer in comparison to physical cash, as there is greater financial inclusion and lesser leakage of money provided by the government for the development of common people.

DIGITAL PAYMENT FRAMEWORK IN INDIA

National Payments Corporation of India (NPCI) *99# is a payment service provided by GoI in 2014, as a part of Pradhan Mantri Jan Dhan Yojana (PMJDY). This service was proposed to cater common man as it can be operated through any featured mobile phone and doesn't require internet connectivity. The key services offered by *99# are, Account Balance, Mini statement, send money using MMID, send money using IFSC, send money using Aadhar Number, show MMID, change M-PIN, generate OTP. *99# service works on Unstructured Supplementary Service Data (USSD) technology, a service is provided by Telecom Service Providers (TSPs) on all GSM mobile phones. The transactions through this service can be done only in banking hours and per transaction cost is Rs.1.5.

- **BHIM(Bharat Interface for Money)** is a new digital payments app based on the Unified Payments Interface (UPI). The app is currently available only on Android; so iOS, Windows mobile users etc are left out. BHIM is also supposed to support Aadhaar-based payments, where transactions will be possible just with a fingerprint impression.
- **E-wallets** allow people to transact online by using any electronic gadget like computer or a smartphone. Post demonetization move in India on 8th November 2016, the RBI has promoted the national banks to create their own wallets and thus wallets like SBI-Buddy came into existence.
- **Paytm** is an e-wallet company in India has further got license to enter in the domain of payment banks.
- Other private e-wallet companies like **Freecharge** - Freecharge is e-wallet service provider along with mobile recharge facility.
- **MobiKwik** is an e-wallet company.
- **IndiaBankBazaar.com** provides an online platform for loans and insurance products.
- **Lendingkart, PolicyBazaar** and **VistaarFinance** are an online lending platform for SMEs.
- **CapitalFloat** is an online lending platform for working capital finance to SMEs.
- **There are total 456 banks providing mobile banking services according to RBI .**

DEMONETIZATION IMPACT ON DIGITAL PAYMENT SYSTEM

Traditionally, online transactions were done either by providing debit and credit card details or through net banking interfaces. While there were issues of security, which kept improving, the payment experience was not very user-friendly. These options were also largely restricted to computers with access to internet. But after the Smartphone revolution, things have changed entirely. India has seen an explosion in digital payment options, from e-Wallets to the Unified Payment Interface to a combination of the two. There are many cashless payment options available in India.

The following table shows the data regarding volume of digital transactions taken place after the demonetization. The table clearly shows the upward trend in electronic payment system. The tremendous increase can be seen in case of UPI with the rise in volume to 171.2 million from 0.3 million. The increase in the USSD (Unstructured Supplementary Service Data) is also remarkable i.e. 7 million to 156 million. The use of mobile banking payment system has also increased from 72.3 in nov,2016 to 102.5 million in march, 2018.

Source: NPCI

BENEFITS OF USING DIGITAL PAYMENT SYSTEM

- Transactions done digitally are traceable, and customers can be accounted for such transactions.
- This is useful for the detection and eradication of black money.
- It is convenient, quick and efficient .
- It lets you stay in control about when you pay and the amount you pay.
- You have the option to cancel the transaction right before the payment is done.
- It saves paper, and thus helps save the environment.

MAJOR PROBLEMS ASSOCIATED WITH DIGITAL PAYMENT SYSTEM

- **Security issue:** With the advent of demonetization, many people were downloading and using various digital wallets applications. Paytm reportedly had around 7 million new users in a day. With such a spike in the digital wallet community, there are many hackers looming around. Moreover, these wallets are also operated through the mobile network, which is least secure method. Unlike credit/debit cards where the personal details of the customers are shielded by the bank, these wallets have no such security. Competent hackers can get hold of the valuable information on the phone, which possesses a serious risk to the consumers. The security concerns also extend towards net banking and using debit and credit card online. Not all payment sites are encrypted, and consumers should decide wisely upon using plastic money online. Card details are to be produced only at certified and valid websites and applications, to reduce the risk of fraud happening. Using public wi-fi to make any sort of digital payments is never safe. One should always try to make transactions over a safe, private wireless network. Using a Virtual Private Network (VPN) connection is one of the better practices to keep the data secure.
- **High rural population:** 9 states(Haryana, UP, Goa, Karnataka, Telangana, Tamil Nadu, Bihar, Chhattisgarh, Uttarakhand) have high rural population of more than 50% . This implies a majority settled in rural areas with limited access to banks.
- **Population having computers/laptops with internet and mobiles:** E-Banking and M-Banking are the two common alternatives to traditional banking for performing various banking operations. These require the use of devices such as mobile phones, computers, or laptops with internet connections. Some states had a very low percentage of population having access to such facilities.
- **Main occupation of some states:** The main occupation of rural states is agriculture. Since November was the harvest month, these states suffered due to the hardship of obtaining new banknotes, which resulted in a negative sentiment for the demonetization policy.

SUGGESTIONS TO IMPROVE DIGITAL PAYMENT SYSTEM

- Keeping in view the problems faced by public after demonetization and government promoting digital payment systems rather than using cash. Indian government has to take various measures to overcome this situation and to make public use more digital methods. Some of these are discussed here under:
- Internet connectivity should be available everywhere. The connectivity should have adequate bandwidth and should be available free or at cheapest rates.

Cyber Security framework must be strengthened by the government. There were many cases which reported that security has been breached and the personal data of many customers has been taken out. The website of IRCTC, Canara Bank was also breached. The legal framework should be quick enough to punish the culprits as well as proper IT mechanism should exist to avoid any frauds and to ensure the security.

Mobile network availability should be available in villages and remote areas also.

Financial and digital literacy will be an important step in improving the situation. Common man should be informed and educated about various financial instruments and use of mobile technology to access banking facilities.

Awareness to be created amongst public to use digital technology and mobile apps

CONCLUSION

The cashless transaction system is reaching its growth day by day , as soon as the market become globalised and the growth of banking sector more and more the people moves from cash to cashless system. The cashless system is not only requirement but also a need of today society. The biometric backed bank accounts not only makes the system fool proof but also serves as an excellent instrument for illiterate people to make payments with just their thumbprints. There are some problems for public to use cashless digital methods at present. But government can create awareness, build trust, provide cyber security framework and provide necessary infrastructure to make it possible for public to adopt digital payment systems. The government has started Vittiya Sakharata Abhiyaan (VISAKA) and outreach campaigns like Digi Dhan Abhiyan and so on to encourage people to adopt digital tools.

“When you expect an honest Government with no corruption and malpractices, you also have to be honest. Honesty is not one way road” – Prime Minister Shri Narendra Modi.

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CONSUMER'S PERCEPTION OF CELEBRITY

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ABSTRACT

Celebrity endorsements are a common tool used by the brand managers. The appeal of celebrity endorsements has attracted both producers and consumers. The study analyzes the perception of consumers about celebrity endorsements. The descriptive research design is used for the study. Primary data is collected through the questionnaire. The data is analyzed through factor analysis. Five factors were extracted. Esteem, Trust, Charisma, Compatibility between product and celebrity, and performance of celebrities were the factors.

Keywords: Celebrity, Perception, Factor Analysis, Esteem, Trust, Charisma, Compatibility

INTRODUCTION

A celebrity is a person who is known to the public for his/her accomplishments in areas other than the product class endorsed (Friedman and Friedman 1979). McCracken (1989) defined celebrity as "any individual who enjoys public recognition and who uses this recognition when they appear in the advertisement in front of the consumers". According to Schlecht (2003) the person who has distinct features and are recognized by a large section of people become celebrities

In Indian culture celebrities from cinema, sports and other fields are considered icons. People try to emulate the role models and they want to get psychological satisfaction of being associated with the celebrities. Following the role models give a satisfaction that they are just like the role models in some aspect. All top three leading celebrities of 2017 listed in Forbes list are from the world of cinema. Mr. Shah Rukh Khan is globally ranked 65th with earnings of US\$ 38 million, followed by Salman Khan with a rank of 71 and earnings of 37 million. Akshay Kumar is the third ranked Indian celebrity with a global rank of 80 and earnings of US\$ 35.5 million (The Hindu Business Line, 2017).

Table-1: Highest Earning Indian Celebrities in 2017

S.NO	Celebrity	Forbes Rank	Earnings (US\$ Millions)
1	Shahrukh Khan	65	38
2	Salman Khan	71	37
3	Akshay Kumar	80	35.5

Source: The Hindu Business Line, 2017

Table-1.6: Earnings of Bollywood Celebrities

Rank	Celebrity	Avg. Endorsement earnings per day	Estimated Income from Endorsements (2015)
1	Salman Khan	4.5	148.5
2	Shahrukh Khan	3.5	126
3	Amitabh Bachchan	2.75	74.25
4	Deepika Padukone	2	48
5	Aamir Khan	2.5	33.75
6	Hrithik Roshan	2.5	33.75
7	Priyanka Chopra	1.25	15
8	Akshay Kumar	1.75	47.25

Source: RBSA, 2016

The average revenues per day was highest for Mr. Salman Khan having an average earnings per day of Rs. 4.5 crores and total estimated endorsements of Rs. 148.5 crores. The second highest average earnings per day was for Mr. Shah Rukh Khan with Rs. 3.5 crores, and total income from endorsements was Rs. 126 crores. There was a big difference in the earnings of next celebrity. Mr. Amitabh Bachchan was the third highest earner with average earnings of Rs. 2.75 crores per day and total income from endorsements of Rs. 74.25 crores (RBSA, 2016).

Sports celebrities are also popular and widely used in the celebrity endorsements. Most of sports celebrities come from cricket. Mr. Virat Kohli was the highest average earning sports celebrity with an average earning of Rs. 8 crores and total earnings of Rs. 90.95 crores. Though Mr. Mahendra Singh Dhoni was the highest earning

sports celebrity with a total earning of Rs. 99.08 crores, his average earnings per day was Rs. 6 crore per day. Among female sports celebrities Ms. Sania Mirza was the highest in both total earnings (Rs. 11.65 crore) and average earning per day (Rs 1 crore). Ms. Saina Nehwal was the second highest earning female sports celebrity with a total endorsement earning of Rs. 7 crore and average endorsement of Rs. 0.75 crore (RBSA, 2016). It is anticipated that the spending on advertising will be 0.45 percent of GDP by 2018 (ibef, 2017).

The popularity of television personalities have made them celebrities and companies are using them in endorsements. The television actors have a share of 4% in the celebrity endorsements by profession, television actresses are slightly higher at 5%, sports personalities have a share of 11% and majority of share is with film personalities. Film actors and actresses both have share of 40% each (AdEx India2013).

The world average of television viewing is three hours and fourteen minutes, for Europe and Middle East the average is three hours and fifty four minutes and for Asia Pacific the average is the lowest among all regions at two hour and thirty two minutes. In India the average television viewing is three hours and sixteen minutes (Dasgupta, 2016).

It was found in a study by Jain and Sudha (2009) that 90.3% of the respondents had watched the retail brands advertisements on television. It was found by Dhotre and Bhola (2010) that 51% respondents watch television daily for one to three hours and 43% respondents watched television for less than one hour and 6% watched more than 3 hours. The respondents had shown highest recall for Mr. Amitabh Bachchan, Mr. Shah Rukh Khan and Mr. Aamir Khan respectively. Ganesan, Saravanaraj, Pughazhendi (2012) also observed that impact of television commercials is high as respondents are impressed by favorite celebrity endorsements. Television is the preferred media for people to watch advertisements Vetrivel and Muthulakshmi (2011).

The highest growth rate in advertising revenue is expected to be for digital advertising from 2016 to 2021. Digital advertising is expected to grow at a compounded annual growth rate of 30.8%, followed by gaming 18.2% and animation 17.2%, followed by radio with 16.10%. Television comes fifth in growth rate with 14.7% CAGR. Print media is expected to have the lowest growth rate among all other mediums with a growth rate of just 7.3% (FICCI-KPMG Media and Entertainment Report 2017). The digital advertising has grown from INR 15 billion to INR 60 billion in 2015 (duffandphelps, 2016) and is expected to grow to INR 294.48 billion by 2021 (FICCI-KPMG Media and Entertainment Report 2017).

OBJECTIVES

To analyze the consumer perception about celebrity endorsements

LITERATURE REVIEW

Ram, Ravindran and Satish (2009) studied celebrity endorsement impact on B segment cars in rural Kerala. The study used chi square, t test and factor analysis. It was found that advertisement and sales promotion significantly influence buying behavior. 35.3% customers consider advertisement as main reason for choice of a brand.

Jain (2011) found that 72% respondents considered that celebrity endorsements increase sales, 84% agreed that people are motivated by endorsements. Only 26% felt that celebrities use the endorsed product themselves. It was concluded that celebrity endorsements had little effect on sales.

Upadhyaya (2012) called for change in attitude of marketers towards rural markets. It was argued that the profit margin may be less than urban markets but market size is much larger. It was suggested that companies should cut down the cost on packaging, as rural customers don't require attractive packaging.

Abhishek and Sahay (2013) examined the impact of culture on celebrity brand endorsement. It was argued that in a country with many sub cultures, the sample to study culture should include all cultural sub categories. It was cautioned that using cultural prepositions developed by various researchers like Hofstede should be assessed in light of changes that have taken place in cultural environment of different countries. The authors cited the success of celebrity endorsements in region to which they belong like endorsements of Dhoni was more effective to influence in Jharkhand, Dharmendra in Punjab, Aishwarya Rai in Goa and Karnataka. Role of celebrity in overcoming negative news about company was also found to be constructive, as cited with examples of Amitabh Bachchan in Cadbury case and Aamir Khan in Pepsi case.

Bajwa et al. 2015 examined the impact of celebrity endorsements on television on rural consumers of Sirsa district. It was found that rural consumers watch television for three to four hours. The popular celebrities were Amitabh Bachchan and Mahendra Singh Dhoni. The consumers considered products endorsed by celebrities to be reliable and of good quality. It was also found that endorsements have led to increase of consumerism.

RESEARCH METHODOLOGY

The descriptive approach was used for the research. The perception of consumers was assessed through a self administered questionnaire. The questionnaire was designed after review of literature. The scope of study was consumers in Punjab and Chandigarh. The primary data was collected from 600 respondents. 417 questionnaires were returned, out of which 17 were incomplete so were discarded. Thus 400 questionnaires were used for the analysis. The reliability of the questionnaire was assessed by Cronbach's alpha. The Cronbach's alpha was obtained as 0.797. The data was analyzed with the help of SPSS using principal component factor analysis.

FINDINGS

This section presents the findings of the study. The factor analysis was done to identify the factors that influence perception of respondents about celebrity endorsements. To assess the suitability of data for factor analysis, KMO and Bartlett's test of sphericity was performed.

Table-2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.755
Bartlett's Test of Sphericity	Approx. Chi-Square	4179.030
	Df	105
	Sig.	.000

Source: Survey Data

The KMO measure was obtained as 0.755, and significance value of 0.00 was less than 0.05, so the data was suitable for factor analysis. Table 3 shows the total variance.

Five factors were extracted as they had Eigen values more than 1. The first factor explained 39.14% variance, and the five factors together explained 77.07% of total variance.

Table-3: Total Variance Explained

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings			% of Variance	Cumulative %
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total		
1	5.872	39.145	39.145	5.872	39.145	39.145	3.472	23.149	23.149
2	1.833	12.223	51.368	1.833	12.223	51.368	2.611	17.409	40.558
3	1.479	9.860	61.228	1.479	9.860	61.228	2.505	16.698	57.256
4	1.216	8.107	69.335	1.216	8.107	69.335	1.508	10.052	67.308
5	1.161	7.738	77.073	1.161	7.738	77.073	1.465	9.765	77.073
6	.776	5.172	82.245						
7	.701	4.675	86.920						
8	.547	3.648	90.568						
9	.406	2.706	93.274						
10	.323	2.155	95.429						
11	.212	1.411	96.840						
12	.196	1.303	98.143						
13	.131	.876	99.019						
14	.092	.613	99.633						
15	.055	.367	100.000						

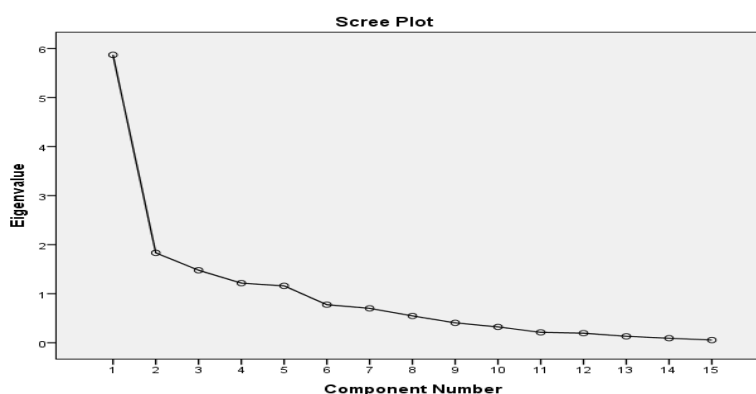


Fig-1: Scree Plot

Table-4: Rotated Component Matrix

Rotated Component Matrix ^a	Component				
	1	2	3	4	5
My social esteem is enhanced by purchasing products endorsed by celebrities	.884				
Customers feel a sense of pride by purchasing celebrity endorsed products	.858				
Consumers want to emulate their favorite celebrities by buying products endorsed by celebrities	.795			-.317	
Regional belongingness of celebrity attracts customers	.744			-.426	
Celebrity Endorsed products are costly		.837			
Celebrity Endorsed products are Trustworthy	.351	.717	.407		
Goodwill of product is enhanced by celebrity endorsements		.705	.437		
Celebrities use the endorsed products in real life	.468	.661			
Popularity of celebrity attracts customers			.776		
Physical appearance of celebrity make the endorsements more effective			.737	.300	
Celebrities transfer their charisma into product			.625	-.459	
Celebrities endorse only those products which are judged best by the expert knowledge of celebrities	.311	.460	.589		
Match between celebrity and product influences customers to purchase the product				.799	
Negative news about celebrities reduces the appeal of celebrity endorsements					-.857
Performance of celebrity in their profession impacts the effectiveness of celebrity endorsements	.365				.695

First factor is named as ESTEEM. The variable that make up this factor are social esteem, sense of pride, want to emulate their favorite celebrities and regional belongingness. The factor loadings were; social esteem (0.884), sense of pride (0.858), emulating celebrities (0.795), regional belongingness (0.744). The esteem factor explained 39.14% of variance.

The second factor was named as TRUST. The variables that contributed in this factor were; cost of celebrity endorsed products (loading 0.837), celebrities are trustworthy (loading 0.717), goodwill is enhanced by celebrity endorsement (0.705), and celebrities use the endorsed products in real life (0.661). The factor explained 12.22% of total variance.

The third factor was named as CHARISMA. The variables that clubbed together in the factor were; popularity (loading 0.776), physical appearance (0.737), transfers charisma to product (0.625), and judged best by celebrities (0.588). 9.86% of total variance was explained by factor Charisma.

The forth factor was named as COMPATIBILITY BETWEEN PRODUCT AND CELEBRITY with a factor loading of 0.799. The factor explained 8.1% variance.

The fifth factor extracted was PERFORMANCE OF CELEBRITY. The loading for the variable was 0.695. The factor explained 7.75% of variance.

CONCLUSION

The results show that customers are not only influenced by charisma of celebrities, esteem, trust but customers also consider compatibility of celebrities and the product being endorsed and performance of celebrity in their profession. The brand managers only focusing on charisma of celebrity may not get any long term gains from the investments on celebrity endorsements. The example of Snapdeal snapping its association with Aamir Khan due to the controversial statements due to rejection of Snapdeal app by consumer, endorsements of Levi's by Akshay Kumar, Nicorette by Shane Warne, Sergio Tacchini endorsement by Martina Hingis, Amazon endorsement by Swara Bhaskar. Failure of brand ambassador like Dhoni to camouflage operational failure of Amrapali indicates that celebrity endorsement is not a panacea for fooling customers. The celebrity endorsements should not be used as a substitute for good quality products but as a tool to reinforce and highlight

the quality and safety of the product. The failure of Maggi in laboratory tests has alarmed consumers about misleading endorsements and has put a question mark on the faithfulness of celebrity endorsements. The brand managers should work on the social ethics and display all relevant facts for consumers and ensure safety of their products and services, otherwise celebrities as well as celebrity endorsements will lose faith of consumers and will not be able to make any significant impact for consumers or companies.

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CORPORATE GOVERNANCE IN INDIA-A CONCEPTUAL FRAMEWORK

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ABSTRACT

With the notorious failures of big corporate houses followed by financial crisis the focus of the national and international companies has been diverted towards the need of strong Corporate Governance framework to prevent such failures in the future. Corporate Governance is commitment of Business ethics and values towards the stakeholders. It deals with timely and accurate information regarding financial performance of the companies. It is a set of mechanism which acts as a shield for the investors and the potential investors to safeguard their interest. The main pillars of the Corporate Governance are responsibility, fairness, transparency and accountability. Corporate Governance gained importance all around the globe and the winds of the same blew in India as well. The present paper focuses on framework of corporate governance in India considering history, principles and theories of corporate governance followed in India.

Keywords: Corporate Governance, Responsibility, Transparency, Accountability.

INTRODUCTION

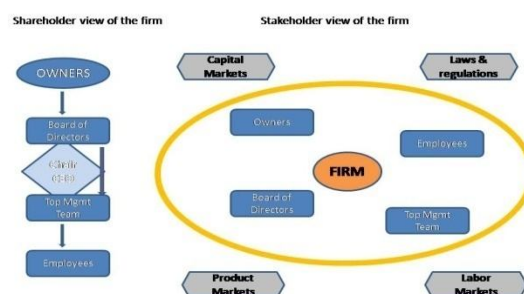
With more than hat rick failures one after the others like Worldcom, Enron and manymore,theissues of corporate governance heated up. The reason for the close down, shattering and failures of these big short corporate houses was poor governance practices and unethical behavior indulged. Later on the financial crises in East Asia then Russia, brazil(Jan,2014) was slowly touching other parts the of the globeforced corporate governance coming up on the hit list of every organization. It was then the subject of corporate governance came into limelight.

The word corporate governance comprises of two words “Corporate” and “Governance”. Corporate means company or organization shared by a group of people together and governance on the other hand means “the way of managing” and together corporate governance works in managing the affairs of a corporate in such a way that the interest of all the stakeholders is protected. As there are number of corporation operating around the globe, need is to develop a law which gives a feeling of fairness and transparency to the stakeholders. The law made, should be such which takes into consideration the benefitand interest of all and reduces the conflict of interest and also watches that right people aredoing right job. So, in short we can say it is philosophy by which an organization is directed and controlled.

Corporate governance against the backdrop of globalization has now become one of the most important issue which is very much required for the survival of organization(Jan,2014).Corporate governance asks for a viable relationship between different parts of a corporation. The system of corporate governance dependsuponfairness transparency and accountability of the management. A good corporate governance system leads to a better reputation of the corporate in the eyes of investors gives good growth and stability to the corporate.

The OECDprinciple of corporate governance states “corporate governance involves a set of relationship between a company’s management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objective of the company are set and means of attaining those objectives and monitoring performance are determined”.

Corporate governance cannot just happen of its own there are number of elements who confirm the compliance of governance .one of the important aspect of corporate governance is the players of governance. Every player of corporate has a role to play. The main and the most important one s are the shareholders, the management and the board of directors”(kaur,2017). At the same time to have an effective system of governance everyone has to play a role. Government and other regulatory authorities should create a good legal environment. The shareholders have to make the board of directorsaccountable. The management should ensure that strategies rules and policies are well executed. Employees at their part should keep their active participation in the working of the company. Auditors being a link between management and owners should give a true and fair financial picture with well verified accounts and books. Creditors should demand for proper financial information, the customers should also be alert to play their part by not dealing with companies which are fraud, non transparent and non customerfriendly(jan,2014)and last but not the least media should keep an eagle and vigilant eye on company s wrong doings. when everyone will directly or indirectly join hands for proper enforcement of corporate governance laws ,results will be in front.



Source: Aguilera and Griffiths (January 2014)

I. HISTORY OF CORPORATE GOVERNANCE IN INDIA

India has worked and launched many corporate governance programs and initiatives since 1990. CII-confederation of Indian industry gave the first voluntary code of corporate governance in 1998. After the CII's code of corporate governance the action was by SEBI, now known with the name of clause 49 of the listing agreement. The third one came in 2002 from the Naresh Chandra committee which handed over its report. The next again was hit by SEBI and the Narayana Murthy committee again came up in 2002, its report was submitted. Taking into consideration the recommendations and suggestions of the Narayana Murthy Committee, SEBI revised the clause 49 of the listing agreement in 2003. Later on in December 2003 SEBI withdrew the one which was revised in 2003 August and Currently the original one is in force. (Deb, 2013)

The CII Code: CII stands for confederation of Indian industry, this CII formed a committee for matters relating to corporate governance and came up with a voluntary code of corporate governance in 1998. The committee believed in a strong conviction that there is a great requirement for good corporate governance in Indian companies to work and perform in global competitive world. It came up with a first draft and then final code of corporate governance with detailed provisions and main focus on listed companies in April 1998.

Desirable Disclosure: All the companies which are listed on the major stock exchange must disclose the information relating to higher and lower monthly averages of the share prices. It is the duty of the stock exchange also to put pressure on the listed companies to adhere to corporate governance rules and submit corporate governance compliance certificate duly signed by CEO or CFO. The disclosure statements are given by different credit rating agency.

Kumar Manglam Birla Committee report and Clause 49: In India the first step of corporate governance code was taken by CII and the companies started to adopt it also but then it was felt that in a country like India, there is a need for a compulsory, strict voluntary code which can give more meaning to this corporate governance aspect. So, keeping this in mind the next initiative was taken by SEBI. It was in 1999 Kumar Manglam Birla Committee was formed to promote and enhance the scope of corporate governance in suggestion country and recommendation of Kumar Manglam Birla committee were accepted and amendments were made and came in our hands clause 49 of listing agreements of stock exchange.

The Constitution of Committee: main constituents of corporate governance are board of directors, shareholders and the Management and these constituents should strongly keep three things in mind for a better corporate governance they are accountability, transparency and equitable treatment for all the stakeholders.

Corporate Governance Objectives: The objective of the corporate governance is to fulfill the interest of all the stakeholders like stockholders, creditors, suppliers, customers, employees and of course the society. The committee for SEBI particularly keeps in mind the interest of shareholders in corporate governance. It is the duty to increase the value of shareholders but at the same time other stakeholder should also be kept in mind. According to the committee the company should not take corporate governance as a compulsory practice but as a duty and important part of their life.

Naresh Chandra Committee Report: Department of company affairs formed a new Naresh Chandra committee in 2002 August to study in depth the subject of corporate governance and issues related to it. After examining the committees came up with its report at the end of year in December. The main focus of Naresh Chandra committee was on financial disclosure and independent auditing.

Narayana Murthy Committee report on Corporate Governance: The next milestone in corporate governance came up when Narayana Murthy Committee was formed by SEBI. The committee was headed and chaired by Mr. N.R. Narayana Murthy. The aim of the committee was to work in betterment of corporate governance and

to give recommendations for in this. According to the results given by committee major suggestions were given regarding audit committee and reports, related party transaction, code of conduct, management of risk and disclosures of financial nature.

Confederation of Indian industry (CII) taskforces on corporate governance: if so many rules and codes have been formed for corporate governance still we came across a number of scandals and misconducts of the corporation. There have been such so many examples Satyam, Mallya's, Sahara Group etc that have brought so much stock in Indian Economy.

Corporate Governance Voluntary guidelines 2009: The ministry of corporate affairs brought about new corporate governance voluntary guidelines 2009. This set up was brought to improve and exchange the corporate governance practices in concern of board, audit committee, auditors appointment and holding a good whistle blowing policy. (Deb, 2013)

Companies amendment act 2000:- In the amended companies act in 2000 number of things were added for corporate governance like

- Reporting for statement of director's responsibility.
- Representation in the board of small shareholders by directors.
- Limitations in directorships
- Making of audit committee
- Setting of high value times for wrong doing in various sections.

New clause 49 by SEBI- The listing agreement:- In a meeting on 25th Jan 2000, amendments in the listing agreement was done adding new clause 49 and published it on 21st February 2000. The clause was for corporate governance and included:-

- Appointing right number of executive, non executive directors
- Formation of audit committee
- Remuneration of directors
- Board meetings
- Report of management
- Corporate governance report

Report on corporate governance by advisory group of Reserve Bank of India:- In 1999 a committee was formed with Dr. Y.V.Reddy as chairman. They made an advisory group under headship of Dr. R.H.Patil from national stock exchange. This advisory group made a report on 24th March, 2001 having suggestion on corporate governance which can be charged to all companies banks of public sector and public sector enterprises.

Companies (Amendment) Bill (2003):- In 2003, in parliament house there came companies amendment bill which requested big changes in companies act in regard to corporate governance. This bill proposed for changes or modifications for around 174. Sections in total but experts, people of industry groups, chamber of commerce, they all opposed the bill and later on it was withdrawn for review by department of companies' affairs.

Revision of clause 49 of listing agreement:- SEBI revised the clause 49 of listing agreements so that nation can have good corporate governance practices SEBI sent a circular to stock exchange and other concerned to replace the old clause with new revised with immediate effect. This circular came up on 26th Aug, 2003.

Then in 2004 "Concept Paper" on company law came up by ministry of company affairs government of India.

Another expert committees under headship of Dr. J.J.Irani came up to check and suggest on concept paper.

Companies Act 2013:- It was a big day 30th Aug, 2013 when companies act 2013 came to the notified giving a new edge to corporate governance. All the sections have not been changed or modified. Here we are throwing light on some important changes that are made an act –

- Concept of one person company

- Changes for cheater documents
- Articles of Association
- Memorandum of associate
- System of holiday meetings
- Directors can attend through video or audio conferencing
- Now AGM to be conducted in 15 months
- Maximum directors on board now increased to 15.
- Compulsorily independent director on the board.
- Woman directors at least one to focus on gender equality
- Auditors to surely report on internal financial system.

PRINCIPLES OF CORPORATE GOVERNANCE

Principles help the government in better implementation and compliance of any law and to bring up more economic stability to the nation. The different principles of corporate governance help in giving better security and protection to the stakeholder. The different aspects which are a part of these principles are:-

Principle of ensuring effective corporate governance framework:- This principle focuses on the role of corporate governance in highlighting fairness, transparency and proper allocation of resources also it pressurizes on quality of supervision and implementation.

Principle of Rights and Equitable treatment of shareholders: Shareholders have certain rights and these principles states that the rights of shareholders should be fulfilled so as to protect their interest.

Principle of Interest of other stakeholders:- Stakeholders means any person who is associated with the corporation and has any kind of interest in the organization. The company should make sure that not only the shareholders, It should also regard and take care of all stakeholders.

Principle of Role and responsibility of board:- The board of directors of any corporate house must be well skilled and qualified to do the justice to all the stakeholders as well as making sure that they are adhering to the required norms and commitments to discharge their duties.

Principle of Disclosure and transparency:- Disclosure and transparency are the two vital pillars of the law of corporate governance. It is duty of the board and the management to disclose the material information to all the stakeholders. The information disclosed must be timely and transparent.

Principle of Integrity and ethical behavior:- Integrity is one important aspect which must be ensured in making all the decisions. There must be a developed code of conduct for board and management for sowing the seeds of ethical and managed decision making.

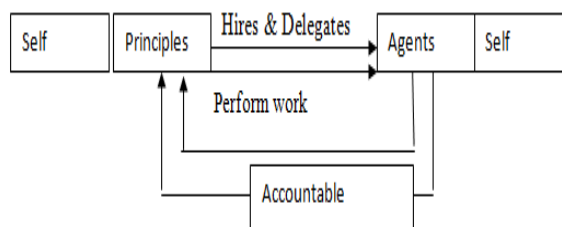
THEORIES OF CORPORATE GOVERNANCE

With passage of time we have come across number of theories or models coming up for corporate governance. The reason for the same is because of extreme and dirty competitions, corporations indulge in wrong doing to be a step ahead. With globalizations situation has become tough there is decrease of government control. So, the need of corporate governance has increased many folds in the present global scenario. There are many theories for corporate governance which explains the relationship among different stakeholders of the organization.

- Agency theory
- Stewardship theory
- Resource development theory
- Stakeholder theory
- Transaction cost theory
- Political theory

Agency Theory: -Agency theory started with its connection in economic theory by Alchain and Demsets(1972). The further improvements in the same were by Jensen and Meckling (1976). In this theory, shareholders are the

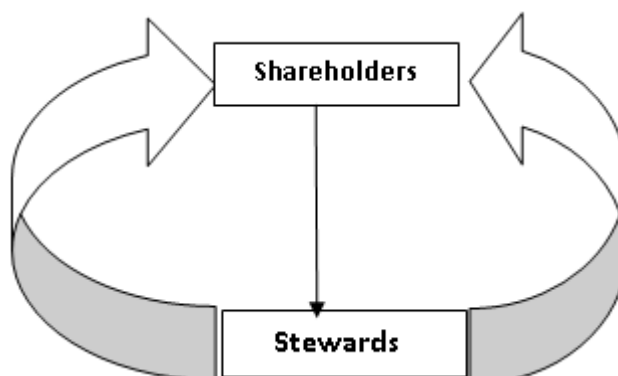
principals and the directors as the agents. These agents are hired by the principals and are delegated work to perform. so, it is based on two aspects (Daily et al2003). Firstly, the work of the company is revolving in the hands of two players shareholders and managers and on the other hand, it discusses that there can be self interest of employees and agents and it is not sure they will work with same interest as expected(padilla,2000).Agency theory mainly explains the separation of ownership and control. Agency theory makes agents ,managers and employees responsible for the work given to them(Abdulla and valentine 2009) but agents can be money minded, opportunistic and selfish.



Sources: Abdulla and valentine.(2009)

Stewardship theory:-In stewardship theory .stewards are the people who do all the work for the shareholder in such a way to protect the interest of shareholders and maximize their profits. The extent of their motivation and satisfaction lies in the facts that how well are they able to protect the interest of the shareholders and maximizetheir wealth & profits(Donaldson and Davis 1991).

They are generally the employee and executives of company having pressure to increase the wealth of the shareholders. lth of shareholders. According to this theory a steward gives a shield of protection and tries to maximizes the profits of shareholder through his work.stewards are the people who relieves the tension of number of interest groups(yusoff,alhaji,2012).



Sources: Abdulla and valentine (2009)

Stakeholder theory:-This theory is the theory for the stakeholders-stakeholders are the people who are linked to or have any sort of interest in our company. It came up in 1970's and was developed by freeman (1984) putting in company's accountability to a large number of stakeholders It is the duty of the board of directors and the management to protect the interest of all the stakeholders whether internal or external and on the other hand to make sure that there arise no conflict, problems or rifts between any stakeholders and if arise, the management should make sure to solve the same at earliest. In the stakeholder theory the manager has to take care of a group of people or stakeholders at the same time as compared to agency theory where only shareholders are to be taken care of.(Abdulla and valentine,2009) ..clarkson(1995) advised that in an organization there are so many stakeholders who are working together .the aim should be to maximize the wealth of all the stakeholders

Resource depending theory: Resource dependency theory explains the role of board of directors in making available and protecting of essential resources to an organization. The timely availability of the resources to an organization helps in better performance and survival of the organization(Daily et al,2003) . The resources which the directors can bring to organization are, information, talent, skills, connections, with supplies, customer's, law values.(Hillman.et.al,2000) discussed that the role of providing resources by directors can be performed effectively through his further connections and links in external environment. There are four categories of directors insiders,experts,support specialist and community influential(Abdullah and valentine,2009).insiders- present and current directors. Business experts can be present, former or people in

some other sister concerns giving business advises. Support specialists are the people who provide support like bankers, insurance companies, legal advisors, media spokesperson etc. last but not the least community influential are leaders, political people, authorities, leaders of social groups.

Transaction cost theory: Transaction cost theory says that an organization consists of people with different points of views and objectives. The firms are so large these days that they have to find out new substitutes for allocation of resource (Abdullah and Valentine, 2009). It has to go through number of deals and transactions within the company and also outside the company. The company compares that whether the cost of contract outside is less than within. If it is so it is accepted or it is done outside.

Political theory: Political theory helps us to teach the politics of such a way to earn the voting support of the shareholders rather than begging or purchasing votes. It focuses on corporate power and other things which can influence the corporate governance mechanism of the company. From last many years now the government of the country is also trying to put political pressure on firms.

CONCLUSION

Corporate governance is the issue which is required in each and every sector of the economy but is vital and compulsory for the corporate houses where people put in their trust in the form of their investments. While going through the conceptual framework it was realized that Corporate Governance is a subject matter which is fundamentally cannot be apprehended quantitatively. It is not sufficient to make the norms mandatory for the companies but it is necessary that how companies actually take it. Either they take it as a check-box or observe it in their spirit. It is all about the discipline followed by the management to become more transparent for the investors and the potential stakeholders. The code of conduct of the Corporate Governance has been prepared by analyzing all the governance standards around the globe. But there are many loopholes which still need to be focused. It has begun as a voluntary effort but very soon it acquired the mandatory status by adopting clause 49. In this sense this approach has accomplished full circle of oscillation between the voluntary and the mandatory style. Still there is a need of vigorous research in the area of corporate governance to make next generation reforms effective for the coming generations.

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TESTING OF CAPITAL ASSET PRICING MODEL IN THE INDIAN STOCK MARKET: AN EMPIRICAL STUDY

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ABSTRACT

The advent of development of any economy is concerned with the rate of savings and investment and how the circular flow of income is generated. There are various advices that investors get before making investment in the stock market but the two important considerations that any investor looks at is – Risk and Return. The quantitative evaluation of this Risk-Return relationship started with the concept of diversification given by Harry Markowitz in the Modern Portfolio. The theory laid foundations for various future researches and modern studies like CAPM (Capital asset pricing model) that was developed by Sharpe (1964), Lintner (1965) and Mossin (1966) independently. According to CAPM the total risk can be divided into diversifiable measured by beta and non diversifiable or the residual risk where the investors are compensated only for bearing systematic risk and no extra return is provide for unnecessarily taking unsystematic risk as it can be easily diversified away by making investment in a well thought of portfolio. The present study is thus an attempt to empirically test if a single factor that is market risk is sufficient in explaining the excess returns of a security and/or portfolio or some additional factors are required to provide more explanatory power to the model. The study used monthly data of the period 2000 to 2016 of securities listed on BSE 500 and index of BSE 500 to be treated as proxy for market index. It tested for the relationship between returns and market index and significance of residual risk using rolling regression. The results revealed that CAPM is not a suitable model in the Indian context for the above said period and there are other factors that need to be accounted for pricing of securities.

INTRODUCTION

Financial management that was earlier a part of economics itself was only concerned with getting finances as and when it was required by the firms but with the development of institutions, markets, instruments financial management is no longer a subset of any other discipline but is itself a huge repository of knowledge. The most important part that has been extensively researched by academicians, researchers and investors over the years is what are the factors that help in determining the returns of an asset. The credit of first such study goes to Harry Markowitz who came up with the relation between risk and returns using the concept of efficient frontier. The area was elaborated further by Sharpe, Lintner and Mossin who brought the concept of market portfolio and divided the risks of the securities into parts namely diversifiable and non diversifiable. The model thus came to be known as SLM CAPM which stated that under the assumptions of homogeneous expectations of investors the return of an asset is a linear function of the market risk as investors are only compensated for the systematic risk as unsystematic risk can be easily diversified away by holding a portfolio. Unsystematic risk is unique risk specific to a particular industry or company whereas systematic risk is broad risk that affects all the securities though the direction and magnitude can be different. Systematic risk has various components however more than two-thirds of it is because of the market or the market risk as measure by beta which shows volatility of the stock return as compared to the market. Thus a beta of more than one show that the stock is more volatile vis-à-vis the market and beta of less than one shows that there is less volatility as compared to the market though the direction of the stock is in the same direction as that of the market. A negative beta however shows that stock moves in the opposite direction of the market movement. To test the relationship various studies have been carried out in developed as well as developing countries and different results are obtained.

LITERATURE REVIEW

Kapil choudhary and sakshi choudhary: The investigation tried CAPM for the Indian securities exchange for the period 1996-2009 utilizing month to month information of 278 organizations, constituents of BSE 500. Study utilized Black et al method for testing of the model. Above all portfolios must be built for which the time of 1996-98 is taken that is being utilized to discover the betas of individual securities which are then positioned and used to build 20 portfolios. Consolidating these example scrips into portfolios had broadened away the majority of the firm-explicit piece of profits in this way improving the accuracy of the assessments of beta and the normal rate of profit for the portfolios. Singular security's betas and returns are utilized to ascertain portfolio betas which is then tested utilizing Black, Jensen and Scholes model. The outcomes uncovered that higher beta isn't related with higher returns. CAPM predicts that the intercept should be equivalent to zero and slant ought to be equivalent to excess returns. Results anyway did not affirm to the normal outcomes and nullified CAPM.

Anamgul and Khan: the study empirically tested presence of APT in the KSE stock exchange using four macroeconomic factors namely money supply, interest rates, industrial production and foreign exchange rate to test APT on the Pakistan stock market, KSE. Time period used for the study is 2000-05 where 37 companies' monthly data has been used. The observation period is from January 2000-2004 which has been used to predict the stock values, and the prediction has been tested for the year 2005. Because of the limitation of APT that it does not underline the factors that are relevant in stock pricing Principal Component analysis has been used to find out factors and their loadings. The results that came out for this study proved that APT does not prove to be effective in predicting stock prices in Pakistan.

Arduino Cagnetti: Tested two asset pricing theories that is traditional CAPM and multi factor beta APT on the Italian stock Market using Monthly data for the period Jan 1990 to June 2001 where 30 blue chip companies that were listed on the ISM were selected for the testing. To eliminate the problem of correlation amongst macroeconomic variables factor analysis was done to find the latent factors whose factor scores can then be used for further analysis instead of using the raw data that could lead to spurious results. The number of factors and factor loadings in the APT model were determined through Principal Component Analysis (PCA). Sharpe Lintner version of CAPM was used to test CAPM. Then for the comparison between the two models three methods, the Davidson and Mackinnon equation, the posterior odds ratio and the residual analysis have been used. The study found that CAPM was not able to significantly predict the stock returns as the fit and the explanatory power of the model was quite weak. APT on the other hand had performed fairly well as compared to CAPM as both shares and portfolios in the ISM were found to be significantly influenced by a number of systematic forces. Five factors have been found relevant in the APT model, with the first factor explaining nearly 40% of the total variance.

Shweta Bajpai and Anil K Sharma: the study tested the applicability of capital asset pricing model using the 500 stocks that have been listed on the national stock exchange for the period 2004 to 2013. For the analysis only the securities that have been listed throughout have been considered and hence only 290 stocks are taken for further empirical investigation. These securities are then combined into 10 portfolios with 29 securities in each. Using rolling regression technique and Fama and Macbeth procedure the study found that in majority of the cases that 62% the risk return relationship as explained by CAPM is applicable. To test the stability of the result the study had divided the entire period into sub periods for the analysis and almost similar results are obtained throughout.

RESEARCH PROBLEM

To test the capital asset pricing model in the Indian stock market using time series analysis so as to fill the research gap the research problem can be defined as "Is beta the only risk factor the is able to explain the excess return of the securities or there are other variables that are needed to be included to add to the explanatory power". The study thus tries to identify the proportion of security returns that are explained by beta and those by the residuals.

OBJECTIVE OF THE STUDY AND SUMMARY

The study is an attempt to empirically test the following

- Is the market risk significant in explaining excess returns in the Indian stock market
- Is the residual risk significant in explaining the returns that are not predicted by the market risk factor or beta

Keeping in mind the above objectives a simple linear regression model is used to find the explanatory power of SLM - CAPM whose results revealed that a single factor is not able to fully explain the excess returns of the securities. The study used Eviews 8 for the analysis.

RESEARCH METHODOLOGY

Capital Asset Pricing Model that was originally developed by Sharpe, Lintner and Mossin is also called standard CAPM or one beta CAPM and it helps in identifying the expected return of a security and/or portfolio based on its sensitivity to the market portfolio. A simple CAPM equation can be presented as:

$$\text{Equation 1: } R_{it} - R_{ft} = \alpha + \beta_{it} (R_{mt} - R_{ft}) + e_{it}$$

To test CAPM in the Indian stock market monthly data of the securities that are listed on S&P BSE 500 has been taken and out of these only those stocks are considered for the study that are listed throughout the period from Jan 2000- Dec 2016 which is the time horizon undertaken for testing of CAPM. This selection however leads to an issue of Survivorship bias but this had to be overlooked as otherwise the comparison would not be

possible. Out of 500 securities only 271 securities are thereby selected on which CAPM equation would be applied. For the risk free rate monthly return of 91 days T-bill is taken from the RBI website. To convert 91 days T-bill yield to monthly return following formula has been applied:

$$\text{Equation 2: } R_f = (1 + R_a)^{1/12} - 1$$

Where R_f = Monthly return on 91 days T-bills

R_a = Annual Yields on 91 days T-bills

For the proxy to the market portfolio index of BSE 500 has been used as it represents 93% of total market capitalization. However as time series data is being dealt with the first step involves testing of stationarity of the series and it has been done using Augmented Dickey Fuller and Philips Perron. Results revealed that the stock prices and index series are non stationary at level and hence they have been converted to log returns to avoid the problem of spurious regression before proceeding for further testing. As described in CAPM the total risk of any security can be divided into systematic and unsystematic risk and the unsystematic risk can be easily diversified away by forming portfolios and hence it is not priced while security pricing. For calculation of individual securities' beta data from Jan 2000 to Dec 2004 that is 60 months in total has been used as it has been shown in empirical evidences that 5 years data is required for correct estimation of beta. The securities are then arranged in descending order and again a regression is run to calculate the residual risk. Different time periods have been used for calculation of beta and calculation of residual risk to avoid measurement error. The last time period that is 2010 to 2016 is then used for testing of CAPM jointly for all the securities combined using a cross sectional regression technique.

R_{it} = Return of individual securities for time period 't'

R_{ft} = Risk free rate of return or return on 91 days T-Bills for time period 't'

α = Excess return of stock as predicted by CAPM equation

β_{it} = Beta of security at time period 't'

R_{mt} = Return of market portfolio for time period 't'

e_{it} = Random distribution error

METHODOLOGY

The study made use of the Fama Macbeth Rolling regression technique wherein different time periods have been used for calculation of beta and residual risk and its testing. The study is based on the securities listed on BSE S&P500 and only those securities have been selected for further study that was listed throughout the 17 year period. It thereby reduced the number of securities to 271. The first step involves calculation of beta using time series regression using monthly data for the period 2000 to 2004. Here BSE 500 index has been treated as market proxy. The second step involves using the beta calculated above to use as independent variables and stock returns as the dependent variable to calculate the residual risk for the period 2005 to 2009 using regression technique. Now for testing CAPM the average returns of the securities are regressed on betas and residual risk as computed above and following results are obtained.

Table-1: Results of Regression for testing of CAPM

Variable	Coefficient	Probability
Constant	0.00976	0.0000
Beta	-0.002756	0.0116
Unsystematic Risk	0.015632	0.0723

Source: Author's own computation

Above results show that the hypothesis that constant should be equal to zero is rejected at significance level of 1 percent showing that there it's not only the beta that is accounted for in the pricing of securities at least for the above mentioned period. Secondly the beta of the cross sectional regression is not significant at 1 percent showing that market risk is not the only factor. The hypothesis is further strengthened by the fact that residual risk though insignificant at 1 percent still has some explanatory power as it is significant at 10 percent. Also the sign of beta is negative which is not supported by the SLM basic CAPM model.

IMPLICATIONS

The regression results revealed that though beta is found to be significant in majority of the securities when tested individually but when the rolling regression technique of Fama and Macbeth was used CAPM failed to

explain the excess returns on the Indian stock market. The results revealed that CAPM is not suitable in the Indian stock market and hence more variables that have an impact on the stock market need to be studied. The study provides a framework for investors that not only the market risk should be looked at while making the investment decisions but other factors too should be looked at before making an appropriate strategy. The study thus lays down the map ahead for future research of testing the impact of firm specific and macroeconomic variables on the security returns.

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A LOW COST HARDWARE AND FUZZY EXPERT SYSTEM FOR THE DETECTION OF GLUCOMA

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Research Scholar^{1,5} and Vice-Principal³, CTITR, Jalandhar²GNDU, Amritsar⁴AP, CTIMIT, Jalandhar**ABSTRACT**

Glaucoma is an eye disease with symptoms like, high pressure on eye, damage of optic nerves and sometimes loss of eyesight. Blindness occurs when left untreated that affects peripheral vision. Early diagnosis of glaucoma requires regular checkups which is too expensive and time consuming. This work proposes fuzzy based decision constructed to overcome glaucoma at initial stage and a low cost Surgical Illuminating Keratoscope that was allocated to overcome the problems of irregular curvature of cornea, cataract surgeries and Penetrating keratoplasty. Fuzzy rule-based helps the medical practitioners to give accurate results by considering patients symptoms. The entire test performed on fuzzy system and the usage viability of Keratoscope was done in presence of ophthalmologist, who further found these systems as precise and useful by comparing accuracy, sensitivity and specificity which results 97%, 98% and 96% respectively. This technique is efficient and having low computational cost.

Keywords: Glaucoma, Fuzzy expert system, Graphical User Interface (GUI), Surgical Illuminating Keratoscope, Cornea.

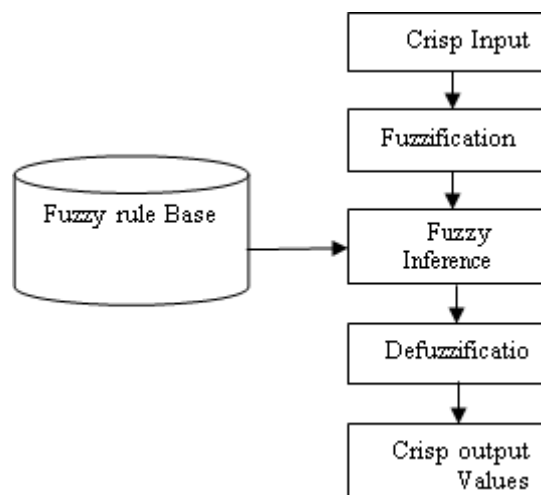
INTRODUCTION

Figure-1(a). Fuzzy Expert System [5]

In the diagnosis of glaucoma six parameters have been considered among which cornea is the one which is expensive to detect, that's why Surgical Illuminating Keratoscope is used which is a hardware device that solves the problems of irregular curvature of cornea and lens and is also cost effective. This is accurate method for the diagnosis and management of Corneal Refractive errors, Corneal Relaxing Incisions [6].



Figure-1(b). Surgical Illuminating Keratoscope [6]

A Surgical Illuminating Keratoscope is deployed to spot Astigmatism, which is the prime cause for an imperfect warp of the cornea. It is the unambiguous and encompassing dome jacketing the eye's iris and pupil or in the outline of the eye lens. In general, the cornea and lens is swish and additionally curved uniformly in all directions, serving to focus light rays piercingly onto the retina at the rear of eye [6]. Corneal astigmatism is that the state wherever cornea has an uneven form. When lens is unshapely lenticular astigmatism is formed. As a result of any type of astigmatism, myopic and hypermetropic visualization are blurred or unclear.

With the IOL in position diminish or toggle off the coaxial illumination, permitting the reflections of the IOL to become visible. The facing reflections of the range of the cornea come into sight with enhanced brightness. Any astigmatism at hand will be associated with the steepest section (the shorter cross section of the speckled mires) with your surgical pre-marks. Reflections from the IOL will be visible bigger, dimmer and somewhat diverse in shade [6].

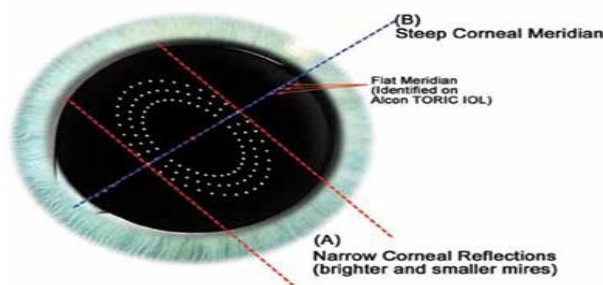


Figure-1(c). Astigmatic Corneal Reflection [6]

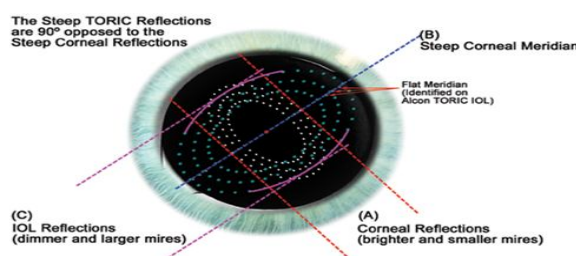


Figure-1(d). Toric IOL Reflection [6]

The slender corneal reflections shown in the image will reorient with sharp meridian marks (B). In this procedure ask the patient to concentrate on blinking LED and the scope has to be in 90 degree angle as that of patient's visual axis which further gives an accurate results.

RELATED WORK

There is a variety of heuristic work done that illustrates the actuation and mold of medical proficient schema

Wang J. et al. (1988) proposed Qualitative method Photo keratoscopy to evaluate corneal shape. The 2-D knowledge on the Keratoscope figure is inadequate to rebuild 3-D corneal surface unambiguously. The assumptions for calculation cause errors. Author ended that the algorithmic rule by account a group of non-linear equations to portray the geometric and optical relationships additional accurately. The set of equations can be interpreted numerically by Newton- Raphson method. Testing on two ellipsoid models ($e=0.5$ and $e=0.75$), the maximum errors (at the outermost ring) were reduced from about 8% ($e=0.5$) and 12% ($e=0.75$) using current method to less than 2% using new method [7]. Vijfvinkel G et al. (1988) proposed qualitative keratometer which provides direct information concerning the whole shape of cornea. Any light source from the outside produces corneal placid reflections originating in the inner wall of the device [8]. Corbett M et al. (1994) proposed the aim of topography and figure out the growth of topographic techniques from keratometry, via photokeratoscopy to videokeratoscopy and further differentiates the pros and cons of this method. The author comes to an end with accurate reconstruction of central cornea that was obtained by the two-step profile method which compared the diameters of individual Keratoscope mires reflected from the cornea with those from calibration spheres [9]. Carvalho L et al. (1999) proposed quantitative theory on surgical keratometer which is computer based to measure central region (3-4mm) of corneal surface. For this procedure a fibre optic of high density is illuminated on a ring shape pattern also called as placid disc is assigned on cornea. Than the reflected images are taken on a device called charge coupled camera which lies on the top of Zeus's microscope. Thus, gets an accurate result for corneal shape with 0.05mm Mean deviation for radius of curvature, 0.24 diopter for power and for cylinder it's 5 degree [10]. Ulieru M. et al. (2000) proposed a neuro- fuzzy expert system for diagnosis and early detection of Glaucoma. Authors introduced a fuzzy IF-THEN rule which helps to classify three different kinds of glaucoma (Pigmentary glaucoma, narrow angle, Open angle glaucoma) and also provide information about the clinical examination. Authors come to a conclusion that the defined neuro-fuzzy decrease the health risks and Needless procedure which decrease the cost of diagnosis [11]. Varachiu N. et al. (2002) offered Computational intelligence strategies (including three algorithms fuzzy logic, neural networks and genetic) to build up an intelligent system for designation and prediction of glaucoma. And then these rules are

compared with clinical outcomes. Thus concludes the defined fuzzy rules are near agreement with clinical results [12]. Inoue N. et al. (2005) projected two approach's discriminatory analyses and threshold processing to calculate the amount of territory of optic disk (OD) and circle cup zone (named C/D ratio) and surveyed this methodology workings well, except there are some complexity that veins within the optic circle is nowhere to be found. Researchers build up another technique by using coordinating to handle this issue. Author assumed that new system are viable to look at the patient situation for glaucoma [13]. Cheng J. et al. (2010) projected a radiant configuration for the assessment of RetCam images for personalized close/open position taxonomy. Author deployed two concepts i.e. edge recognition and arc recognition to portray open angle and close angle glaucoma. Further they have retrospectively the clinical catalog and outcomes [14]. Xu Y. et al. (2012) and accustomed Image processing and learning principally based system that was anticipated to frontier and classify Anterior Chamber Angle (ACA), in view of multi-scale HOG highlights [15]. Krishnan M et al. (2012) put forth an original Intuitionist Fuzzy Set (IFS) premise based method deployed to slice the optic disc in retinal fundus images. Author sliced the optic disc by means of Otsu, Gradient Vector Flow (GVF) snake and A-IFSH based segmentation to pick the finest schema. The method has been evaluated on 100 images including 30 healthy, 39 glaucomatous and 31 DR images. The proposed IFS segmentation method obtained the F -score of 0.92 and 93.4% precision as compared to the work of other two segmentation Methods [16]. Padmanaban K (2013) presented fuzzy c mean clustering method which is deployed to spot the optic disc in color fundus image. Author separate green channel from the RGB illustration and used median filter to denoise the image along with ROI extraction. Authors concluded that this Proposed system increases efficiency to locate optic disc [17]. Elshazly H et al. (2014) presents the predicament of before time recognition of disease called primary open angle glaucoma (POAG). Author conducted a test in which he assembles classifier by integrating principle component analysis with rotation forest tree (ROT). Three classifieds are namely decision tree (DT), fuzzy logic and neural network (NN). At the end he concluded that ROT got high classification precision in most of the test and thus gets accurate results and early detection of glaucoma [18]. Agarwal A. et al. (2015) introduced adaptive thresholding technique which combines picture highlights like mean, variance and standard deviation

to the region of optic circle and optic disc from the fundus picture. Later they differentiate the outcomes medical database and this framework gives promising outcomes with 90% accuracy [19]. Aloudat M. et al. (2015) introduced a Haar filter to rule out the open and closed angled glaucoma at first by knowing the thickness of fluid in cornea. Author compares the result with the Patients of the Jordanian Governmental hospital (Al Ameera Basma Hospital). The sufferers were of age group ranging between years old, and all of them had vision ailments [20]. Haveesh G. et al. (2015) proposed two systems explicitly fuzzy classifier and picture processing to differentiate glaucoma. The main purpose of this technique is to determine CDR and then arranging glaucoma based on calculating CDR. The principle of this study is to perform retinal fundus image for magnification which is must to deal with the cup to disk ratio of image by utilizing online data base and managing the disease from its symptoms using fuzzy classifier in MATLAB [21]. Lamani D. et al. (2015) introduced several parameters such as central cornea thickness, neuro retinal thickness, intraocular pressure etc to study glaucoma by using clinical equipments like perimetry, pachymetry, tonometry etc [22]. Kumar B. et al. (2016) introduced a picture processing method to detect glaucoma. The scientist used different techniques such as PCA, HOS and combining textures and compared their results to look for accuracy. The outcome of this technique comes with 86% success out of 200 real pictures for two phase classification with SVM [23]. Ohri K. et al. (2016) introduced Fuzzy based inference engine to examine two different breast cancers that are malignant and benign. This paper juxtaposes the fuzzy outcomes with medical results presented [24]. John A et al. (2017) proposed fuzzy expert system (FIS) to diagnose Glaucoma from normal and Glaucomatous eye. The end result found out 88% accuracy by contrasting fuzzy outcomes and medical [25]

PROPOSED SYSTEM

This section embraces the loom embrace in building the broad-spectrum fuzzy constitution for conclusion construction framework. The fuzzy skeleton is a composition which is reliant upon fuzzy set proposition; it picks up a fuzzified description of patient's current state and induces fuzzy association. With a specific aim to figure out fuzzy construal to fullest i.e. to bring about distinguished interpretability and the aptitude to embrace generality is very momentous. Generalization involves that fitness to state the state-activity as opaque as practicable. Generalization rules permit well-built rule base, prompt point of reference and distinct fuzzy interpretability. A fuzzy reliant assessment support method achieve in sequence and understanding in conception of IF-ELSE strategy to sketch fuzzy inference. Therefore, a fuzzy master framework permits an uncomplicated passage for setting up an accurate arrangement with aid from an indistinct area. The known fuzzy set with reference to membership work characterizes the information approbation to its exact membership and it should be positioned in range of (0, 1). A fuzzy set has no cotemporary merit and has a fuzzy

intermediate. The quadrilateral membership plot is a chore having 4 variables a, b, c, d where a and d denote feet of quad with relationship level 0 and b and c be a symbol of shoulders of trapezoidal with

IV.METHODOLOGY

Figure 4.1 represent the designing of the expert system by using six input variables i.e. Intraocular pressure (IOP), Cup to disc ratio (CDR), Rim to disc ratio (RDR), field of Vision, Corneal thickness, Angle be used. These inputs are used to deduce the health ranking of individual. After selecting the input variables uninterrupted stair is to fuzzify the factors i.e. we have to institute the fuzzy sets for each and every giving variable and the resultant variance of the belonging to each fuzzy set. Fuzzy rule-base permits experts acquaintance to imitate on indications of continuing and then supports the rules developed to give a near accurate conclusion. On-line prime medical care symptoms evaluation implies citing of these symptoms that are fundamental for the analysis and conclusion of disease. Figure 4.1 correspond to the methodology for the proposed system.

Fuzzy Inference System (FIS) and Graphical User Interface (GUI) are very powerful tools provided by MATLAB to propose a Fuzzy verdict structure. The training part with reference to fuzzy inference system is done by the FIS editor, which is another strong tool provided by MATLAB. There is a straightforward and logical illustration in figure 4.2 that correspond to the denomination of all contribution (6 input parameter values) on the left hand side and output on the right hand side. So far, the quantity of inputs could also be restricted by the existing memory of your machine.

A) INPUT VARIABLES

B) Six input variables are used for designing this expert system which include Intraocular pressure (IOP), Cup to disc ratio (CDR), Rim to disc ratio (RDR), Visual field, corneal Thickness and Angle. These inputs are used to predict the health status of a person. We have to determine the fuzzy sets for every input variable and the corresponding range of the belonging to each fuzzy set.

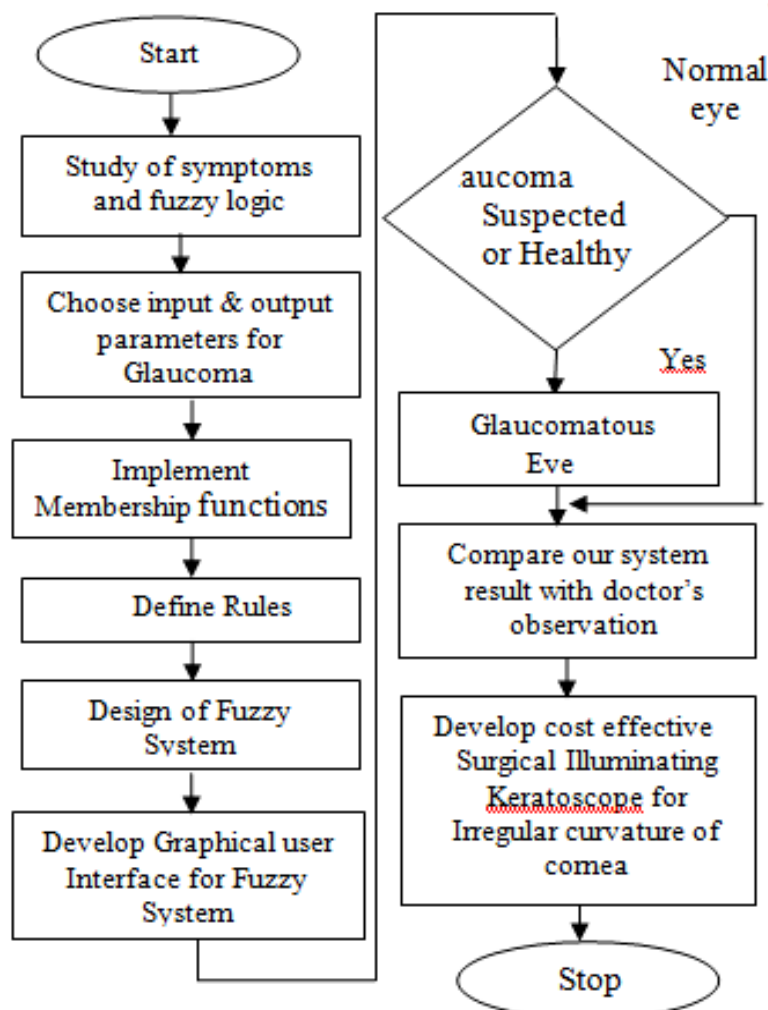


Figure-4.1: Methodology to Implement Proposed System

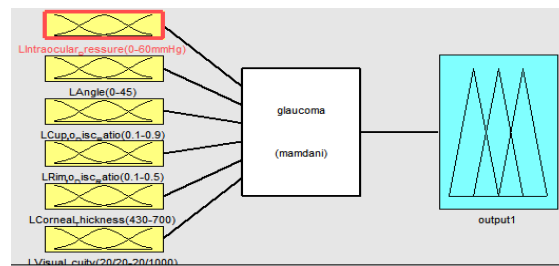


Figure-4.2: FIS Editor with 6 inputs & 1 output

B) MEMBERSHIP FUNCTION

All association functions are associated with each variable. The relationship functions of parameters are revealed below portrays the unambiguous outline of the membership functions. The membership function is used to edit rules and be confirmation for all the relationship functions for the integrated fuzzy inference system, jointly cooperating input & output parameters.

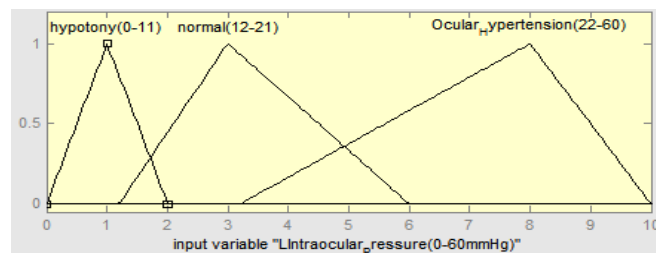


Figure-4.3 (a). Membership function plots for Intraocular Pressure

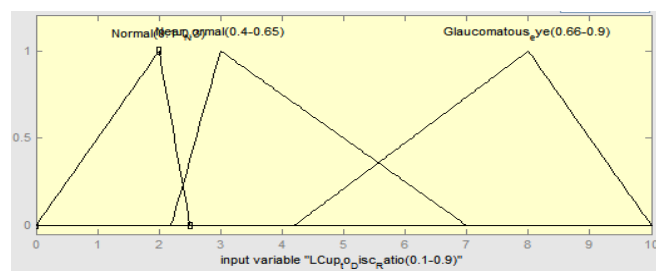


Figure-4.3(b). Membership function plots for Cup to disc ratio

It is the manner of the unification of the rules. The membership functions of the entire rules previously antecedently clipped at some stage in rule evaluation are in use and unified to one fuzzy set. In progression a quantity of clipped subsequent relationship functions are represented conjointly to one fuzzy set for each production variable. The inference methodology used is the Mamdani inference method. Table1. Shows the Ranges of Membership function parameters for the input variables

Table-1: Ranges of Membership function parameters for the Input variables

C) OUTPUT

The proposed fuzzy inference system (FIS) provides following outputs for the detection of Glaucoma:

1. Normal eye (0-3)
2. Glaucomatous eye (3.1-5.3) Mild
3. Glaucomatous eye (5.4-7.6) Moderate
4. Glaucomatous eye (7.7-10) Severe

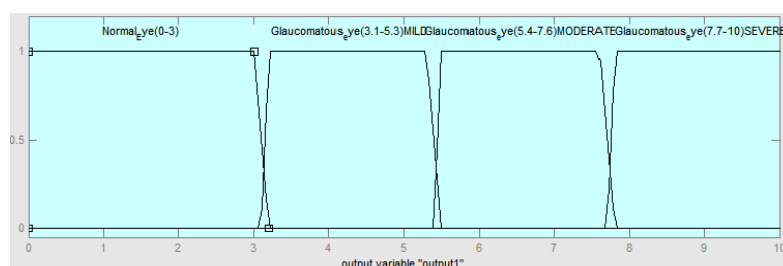


Figure-4.4: Membership Plot for Output

D) RULE EDITOR

Describing the appearance of the structure is called fact list which can be edited by rule editor. Rule editor comprises of a huge editable text field for displaying and writing rules. In totting up, rule editor has a range of well-known landmarked constant as those inside the FIS (fuzzy Inference system) editor and, together with the menu bar and also the status line membership function Editor.

Rules = $M^i[23]$

M = Membership functions

I = Input parameters

```

1. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
2. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
3. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
4. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
5. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
6. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
7. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
8. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
9. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
10. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
11. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))
12. If (Lintraocular_Pressure(0-60mmHg) is hypotony(0-11)) and (LAngle(0-45) is Wide_Open(35-45)) and (LCup_to_Disc_Ratio(0.1-0.9) is Normal(0.1-0.3))

```

Figure-4.5: Rule Editor

E) FUZZIFICATION AND DEFUZZIFICATION

The next segment of fuzzy expert system is the Fuzzification. It is the technique of mapping a crisp evaluation of an input to relationship degrees in a number of fuzzy linguistic multivariate. Defuzzification is the converse course of action of Fuzzification. Thus crisp inference output is known by the Defuzzification method later than estimating its input significance.

V. EXPERIMENTAL RESULTS**A) RULE VIEWER**

B) Rule observer is used to analyze the fuzzy inference system. Work out this observation as an indicative to verify, for example, the unit membership function appearance implicate the results. The rule viewer unveils the information of the absolute fuzzy inference method. In accumulation, menu bar and status line are intimate items. Specific input value can be inputted in the text field situated at lower right location. In the lower right, there is a text field where you can enter a specific input value. Figure 5.1 rule viewer of the projected organization is displayed. It shows the result of whole fuzzy system. At left plane at the crest, we get = 5.95 (defuzzified values) which means the person is normal.

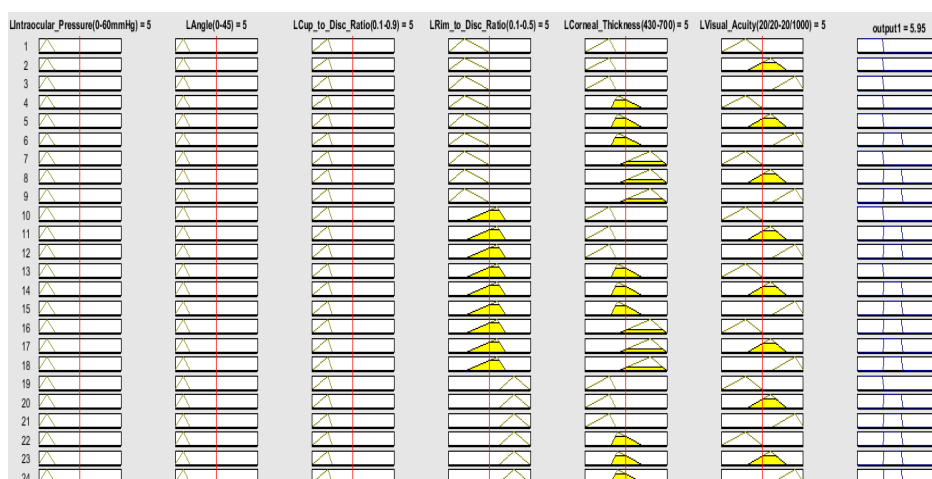


Figure-5.1: Rule Viewer

A) SURFACE VIEWER

B) To evaluate the reliance of 1 of the outputs on 1 or 2 of the inputs Surface viewer is used, for the fuzzy inference system (FIS) it spawns and devises an output surface plot. From 2 input variables and one production variable of a FIS It engender a 3-d surface. Figure5.2 shows the surface plot of disease between two symptoms angle and intraocular pressure. Graph shows that when the range of angle is between 0 to 10 and intraocular pressure is between 0 to 10 then there is a disease will be recognized. Input is represented by blue color and output is represented by yellow color.

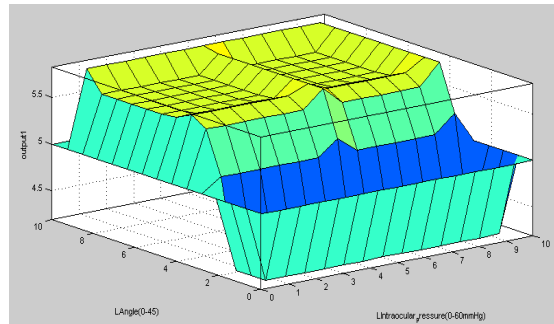


Figure-5.2.3-D Surface View b/w IOP and Angle

C) GRAPHICAL USER INTERFACE

D) MATLAB Graphical User Interface is the frontier information from the MATLAB graphic objects formed for human-computer interface. GUIDE by design spawns 2 forms of MATLAB archive; one is on behalf of MATLAB edge figures and a supplementary is for M-file, habitation accumulates the authority operation of the MATLAB program. The M-file transport code to initialize the GUI and embrace a support in favor of the graphical user interface click-backs, the routines that achieve once a user interacts with a GUI element. By means of the M-file editor, you can add code to the click-backs to achieve the functions you wish. Figure 5.3(a), 5.3(b) and 5.3(c) show the GUI for the anticipated system

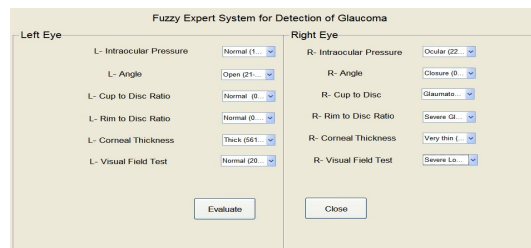


Figure-5.3(a). Glaucoma Detection GUI with Input Parameters



Figure-5.3(b). GUI showing Decision on Glaucoma according to Input Parameters

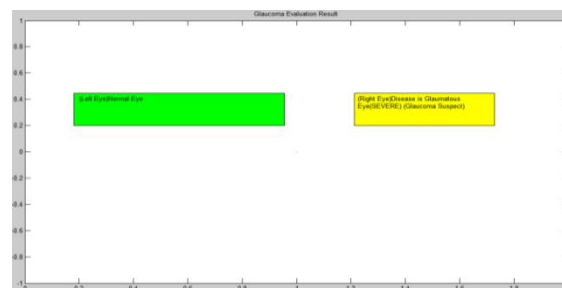


Figure-5.3(c). Glaucoma Detection for Both Eyes

The projected method represents recognition of normal eye and glaucomatous eye by using the parameters (IOP, CDR, RDR, Angle, Field of Vision, and Corneal Thickness).In fuzzy inference system (FIS) there are 729 rules that are defined among which 100 rules were selected randomly.

Among 100 rules 50 rules are of normal patient and 50 rules are of glaucomatous patient, and then the outcome are compared with the ophthalmologist .The result shows that 97 rules are similar as that of ophthalmologist results. Thus, accuracy of the system comes 97% [26].

Accuracy

$$= \frac{\text{No. of correct Patients}}{\text{Total No. of Patients}} \times 100 \quad (1)$$

$$= \frac{97}{100} \times 100 = 97\%$$

Sensitivity is defined as the ratio of True Positives to the sum of True Positives and False Negatives. True Positives is the case when a glaucomatous image is classified as glaucoma and False Negatives is the case when a glaucomatous image is classified as non-glaucoma [26].

$$\text{Sensitivity} = \frac{\text{True Positive(TP)}}{\text{True Positive(TP)} + \text{False Negative(FN)}} \quad (2)$$

$$= \frac{49}{49 + 1} = 0.98 = 98\%$$

Specificity is defined ratio of True Negative to the sum of True Negative and False Positives. True Negative is the case when a non-glaucomatous image is classified as non-glaucoma and False Positives is the case when non-glaucomatous image is classified as glaucoma [26].

$$\text{Specificity} = \frac{\text{True Negative (TN)}}{\text{True Negative (TN)} + \text{False Positive(FP)}} \quad (3)$$

$$= \frac{48}{48 + 2} = 0.96 = 96\%$$

C) Hardware Implementation

D) A Keratoscope is designed to provide precise centration with a flashing fixation target and three concentric rings of illuminating LED's. These LED's are arranged at every 10 degrees. Keratoscope is outfitted with a hegemony switch that sways the concentration of illumination. This hegemonybutton is intended to securely hold the surgical Keratoscope. Clockwise rotary motion of this switch switches on the device, givingpreliminary illumination of the LED fixation objective. The bright orange flashing LED is deployed for any process that aids the surgery. Then the patient is asked to fixate on a target. When the switch is rotated more in the clockwise direction the full ring light array begins to illuminate at its lowest level. With continued rotation the array will achieve full brightness. In Figure 5.4 the illuminating medical instrument Keratoscope is mounted upon the target lens of surgical microscope with the appropriately sized mounting ring measuring 48 mm. These rings are accessible in a variety of sizes and they are 48mm, 65mm, 70mm, and 82mm.We have set our target on the corneal reflection at standard surgical microscope functioning distance of 175mm. Hence, the microscopic image of the eye beneath surgical illuminating. The Keratoscope is represented in Figure 5.5, in which it shows bright light in the form of circle without any irregularity which results that the patient is normal.



Figure-5.4: Examination of Cornea using Surgical Illuminating Keratoscope



Figure-5.5: Reflection Image of Surgical Illuminating Keratoscope

CONCLUSION

Glaucoma is most wide-ranging disease at present, so in the early on identification is exceptionally important to keep individuals experiencing Glaucoma. The highest loyalty choice is the early finding which gives doctors to detect the Normal eye and Glaucomatous eye and also surgical Keratoscopewhich is low cost and effective solution to detect uneven curvature of cornea. In this research, we have exhibited a fuzzy structure on decision supportive network for the diagnosis of Glaucoma. The prediction of the Normal eye and Glaucomatous eye is done by the proposed fuzzy interference framework.

The proposed system can administer different sources of input which can be far superior to handle susceptibility during investigating period. The results are compared with clinical dataset of 100 patients; the system gives promising results over 97% accuracy. This present framework can be extended by expanding number of inputs. The surgical Keratoscope designed and build has proven to be very effective and useful not only for Superspeciality hospitals but also to small scale eye clinics as it is cost effective and also serves the purpose for which it is build. Therefore, This Technology will have a Great Impact in Future.

SIGNIFICANCE STATEMENTS

This study discovers the serene, quicker and cost effective way to identify glaucoma. It is valuable for the civilization as it is possible to detect glaucoma with only two of the six examinations on hand. The patient can decide on for more examination for best clarity if the first two give you an idea about normal eye according to our Fuzzy expert system (FIS).The of severity levels of glaucoma also represented by this system i.e.

1. Normal eye
2. Glaucomatous eye (Mild)
3. Glaucomatous eye (Moderate)
4. Glaucomatous eye (Severe)

This research will help the researcher to uncover the serious faster discovery of glaucoma that is usually takes some time to get detected as the six tests are costly. This investigation involves six parameters i.e., Tonometry, Ophthalmoscopy, Pachymetry, Gonioscopy, Perimetry. Previous researchers used a maximum of two parameters. Easier, quicker and cheaper recognition of glaucoma can be arrived by utilizing the projected fuzzy interference framework.

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MEDICINE RECOMMENDATION ON BASIS OF MULTIPLE CRITERIA USING DATA MINING & MACHINE LEARNING ALGORITHM

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ABSTRACT

Nowadays people are more conscious about products, especially if that related to health. Many recommendation systems are available to guide the people on basis of what other's use. It is like decision support system which helps user in taking decision. There is lot of information system developed for user and in evolving stage which aims to provide guidance with more n more accuracy. There always news of death due to wrong medication which not always a fault of professionals but sometime it like constraints to their knowledge. Medicine recommendation system is available like E-MYCINE but not active due to some constraints. However, the advancement in artificial intelligence and machine learning now everything is transformed into automated and making everything automated up to some extent and try to limit the constraints to increase the efficiency.. The purpose of this paper is to develop such recommendation system which helps healthcare professionals as well as patients in deciding which medicine is best suited for which disease. In this, medicine recommendation system is proposed using Naïve Bayes which takes symptoms as input from user and then after analysis predict disease name, then accordingly recommend medicine as well as generic name of medicine which help user in purchasing low cost medicine.

Keywords: Machine Learning, Data Mining, Recommendation System, Artificial Intelligence, Decision Support System, Naïve Bayes.

INTRODUCTION

Recommendation systems are available for product and services which works fine for online platform. These systems collect information from various users to guide another user for providing relevant information. These type of system are less or not available in medical system. Lots of people died due to wrong medication which appeared in news in recent past years that lead to major consequences and patients suffer. There is numerous equipment's as well as expert system is available that helps healthcare professional in diagnosis of disease and save many lives. But there is no universal medicine recommendation system which having all information of medicines, its benefits and consequences that help healthcare professional in advising medicines. Healthcare professionals are intelligent enough to recommend best of best medicine but even they don't know the all names and brands of medicine that might be better than what they recommend or available in market. So the main purpose of this work is to provide such medicine recommendation structure which takes symptoms as input and by predicting disease name, recommend medicine name. By using this structure mishappening can be controlled too much greater extent. So, this recommendation system uses data mining process for analysis of symptoms and algorithms to predict or recommend medicine. There are three ways to develop recommendation system i.e. collaborative filtering, content based filtering, and hybrid based filtering which filters recommendations. users view and rating for generating

- **Collaborative filtering method:** In online platform this method collaborate all users rating to generate recommendation. Likewise in medicine recommendation, symptoms of patients and then recommend medicine by using Naïve Bayes algorithm for classification of symptoms.
- **Content based filtering method:** In this content of users watched history taken to recommend means the content of product or service taken to generate recommendation. Likewise, it looks deeply into symptoms and analyses them to predict correct output.
- **Hybrid filtering method:** it is combination of collaborative and content based technique and minimizes the disadvantages of above two approaches such as user behavior and content of product matter like TV shows recommendation.

Below is the figure is for medicine recommendation and shows how this system works. It takes input from professionals whom they ask to patients and by giving accurate information of health, algorithm analyses the given input and provide medicine with description.

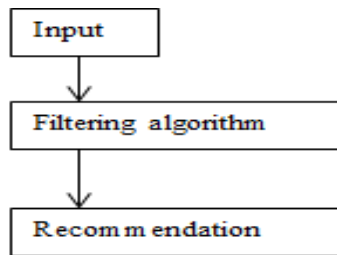


Fig-1: Recommendation System

DATA MINING

Data mining is tool which used for data processing, analysis and finding objective which is knowledgeable. It is used in recommendation system for preprocessing and cleansing of raw data to generate recommendations. There are numbers of algorithms present which help in performing all valuable tasks for recommendation generation like classification, clustering, association. So, the data mining process will have these steps:

1. **Selection:** Identify the sources of information means where to get data which may be any website or data warehouse.
2. **Pre-processing:** analysis of target data to find out relevance and matching statistics.
3. **Transformation:** extract relevant data from target data for further use.
4. **Data Mining:** Apply data mining algorithms, queries to determine the patterns between target data.
5. **Interpreting and reporting the results:** Knowledge Representation a take actions on basis of findings.

RULE BASED SYSTEM

Mainly, recommendation or decision support system built upon Rule Based system and utilizes the IF-THEN rule concept. In this rules are created in form of IF-THEN which means if some conditions satisfy then result will be generated. For this first rules are created having some raw figures and then these rules are analyzed, even some rules are discarded if they don't contribute in particular result then output is generated. Actually this system based upon how human thinks like if (some conditions or event occur true) then result will be desired output. These type of system is built in two ways i.e. first one is forward chaining in which output depend upon input and second one is Backward chaining in which from output to input is inferred. This system is developed by using two approaches i.e. Knowledge based approach in which all necessary data is given as input and stored in memory area; other one is data based approach which include Supervised learning and Unsupervised learning.

Supervised learning system is like someone fitted all necessary arguments & data for prediction in which output also provided. In Unsupervised learning only input are given to system and system itself learn or act according to input to predict output. Rule Based System work upon rules in which firstly rules are made to generate output, then rules are simplified or you can say some of rules are discarded which doesn't contribute in output or not necessary for system, then rules are represented for efficient outcome.

In medical diagnosis, forward chaining rule system is used in which known input like symptoms are given and then output is derived from given input.

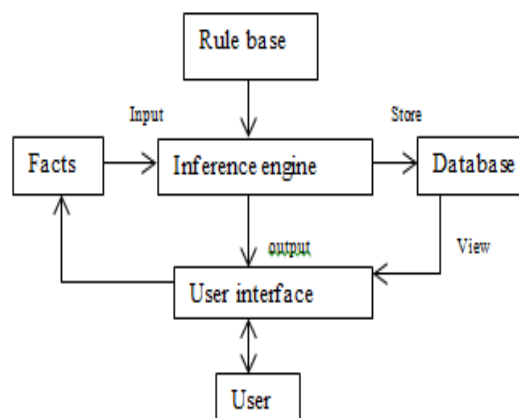


Fig-2: Rule Based System

RELATED WORK

In this [1] authors give insight of categorization of rule based system on basis of their features and characterization. System is classified on basis of input and output format and association between input and output. So, system is divided into classification based, regression based and association based. Further how system should be constructed i.e. on basis of logic used which will be probabilistic based approach on probability logic, deterministic based approach on Boolean logic, and fuzzy based approach on fuzzy logic. Authors discussed Knowledge Based and Data Based approach for construction and also advised to use Data based approach due to some advantage over knowledge based. They also talked about which approach is used for rule generation and simplification that is Separate & Conquer. Prism algorithm uses Separate & Conquer as it has advantage over Decision tree algorithm but it is expensive. So, authors give another algorithm which is "Information Entropy Based Rule Generation" which minimizes the uncertainty which exists in earlier algorithm and generate rules on basis of calculation of entropy of each branch of tree. So it takes less effort as compared to Prism algorithm.

In this [2] authors proposed system for physicians to provide accurate diagnosis of patients. The SOSS architecture provide quality diagnosis to rural area where specialists present or not consist a user interface through which symptoms are entered, a diagnosis manager who diagnose the case, a telemedicine kernel which interact with system and databases where information about disease and medicine.

In this [3] authors explain and used association rule of data mining to improve the rate of prediction of heart disease Association rules having three component which is support, confidence and lift which help in making rules and evaluation of rules. There are some constraints when records get transformed to predict output. These constraints which present in association rule algorithm like input size, validation and verification of rules. So, author gave algorithm which minimizes the above constraints when records get transformed from sample data to predictive outcome of disease.

In this [4] authors propose an adaptive and learning model which depend upon rule based support system. It is a monitoring system which continuously monitors rapidly increasing data in healthcare system and provide accurate pre- processing of data, the storage of data through mobile sensing device. By using these device professionals continuously monitor health of persons like ECG, heart rate, heart beat and other health parameters. The data which accumulated through this process can be used for analytics efficiently and discover hidden patterns in health condition of patients.

In this author proposed medicine recommendation system in which internet reviews are source of input to system [5]. This system is for Diabetes II type disease in which reviews are filtered from numerous people and study done to check feasibility and detrimental effect on patients. Feedback is also used in this for better recommendation of medicine and to propose better and improved recommendation system. The main challenges for this type of system in which accurate reviews should be there, if any false reviews done then prescription generated might be wrong. For success of this system, reviews must be accurate and correct. To get correct reviews sentimental analysis done and on basis of analysis medicine will be added or removed from database after consulting doctors who are specialist of diabetes.

In this author provide insight into how big data analytics with machine learning, can help in examining health issues as well as recommending healthcare system for patients [6]. For this, electronic health records of patients from different-different locations are used for predictive system which integrated with Spark Streaming component of big data. In this authors used Hybrid Recommendation Model which is combination of collaborative, case based and content based filtering using Bayesian network classification algorithm for diabetes disease.

Physicians undertake different-different characteristics and features to evaluate patient's health and advice or recognize disease. In this paper author proposed recommendation system for recognition of disease and treatment for the same [7]. Author used two variables which is age and BMI and categories the patients according to age. Author used list for representation of data which has three attribute: Symptoms, Name of Disease, and medicine. Pearson's correlation coefficient is used to integrate all information which gathered from patients and relationship established between them. K- Nearest Neighbor algorithm is used to filter disease by applying minimum threshold value on Pearson correlation to minimize the size of data. At last which had biggest coefficient value is chosen as neighbor corresponding to main patient.

PROPOSED MODEL

The main motive behind this work to develop medicine recommendation framework which support professional's knowledge and guide patients in verification of medicine. This system will be developed by using

concept of rule based system in which forward chaining is used with data mining task along with machine learning algorithms.

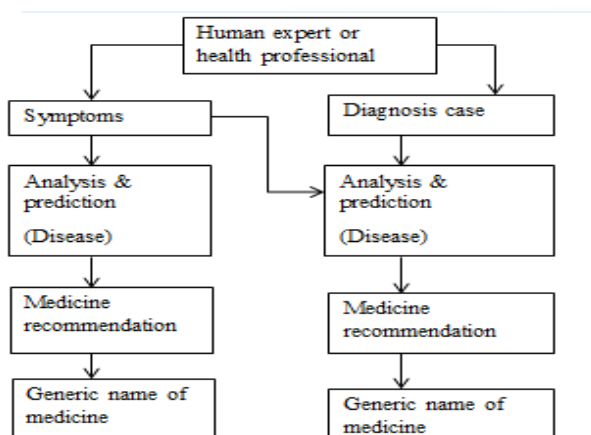


Fig-3: Proposed Recommendation model

Rule base system in which rules are input upon which output generated. This system helps healthcare professionals, market professionals in taking best decision from large set of information. Rule base system works upon:

- Generation of rules, in which rules are created which act as input for system.
- Simplification of rules, some of rules are discarded which are not necessary or converted into simple form.
- Rule representation, at last rules are represented in system.

Rule based approach uses classification and regression for prediction of outcome. In this Naïve Bayes classification algorithm used to categorize the symptoms and probability is calculated upon which disease will be predicted then correlation is established between disease and medicine to prescribe best medicine available.

Let's understand how this framework works:

- In this Collaborative filtering approach of recommendation system is used with Naïve Bayes algorithm:
- When symptoms of patient entered to system, it collaborate all others patients data to check for similarity in symptoms.
- Then Probabilistic model of Rule based system is applied to evaluate the probability and correlation between symptoms, diagnosed case to predict the disease then ultimately medicine will be prescribed.

Naïve Bayes Algorithm

- In Naïve Bayes first class labels are created in which any feature is considered independent of other feature; secondly, Maximum Likelihood Estimator is calculated to estimate parameter of features and decide the data distribution format.
- Training set T which divided into two sets i.e. dependent set $X=(x_1, x_2, \dots, x_n)$
- and class variable $C=(c_1, c_2, \dots, c_n)$.
- Two assumptions:
- Firstly assume no pair of features is dependent.
- Secondly, features having some weight.
- Probability will be calculated as:
- $P(A|B) = P(B|A).P(A)/P(B)$

CONCLUSION & FUTURE SCOPE

In this universal medicine recommendation system is proposed which not only provide medicine name but also its description as well as generic name of medicine which will be beneficial for patients as well as healthcare professionals. The proposed system work upon concept of rule based system and Naïve Bayes classification and

Support Vector Regression algorithm is used to develop recommendation system without fail. This paper presents all the work which have been done till in medicine recommendation system. In all papers author(s) applied their own new techniques of data mining and machine learning which are available to improve the existing system or gave some new ideas about how recommendation system should look or how it should work for betterment of patients and healthcare service. The main aim of recommendation system to recommend appropriate medicine without fail and optimization of service is above all. Evidence based medicine and collaborative filtering technique is mainly used in prescribing medicine to patients. But still there is scope of improvement in making effective, accurate system. Support Vector Machine algorithm gave more accurate result. But there is not complete package of recommender system in which system can generate output for number of disease. In future we can work with huge amount of data from which we can infer number of disease and then can predict medicine accordingly as big data is latest trend.

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EARLY DIAGNOSE OF CONGESTIVE HEART FAILURE BASED ON FUZZY LOGIC TECHNIQUES

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In recent ten years, heart failure becomes the leading cause of death in whole world which is estimated by World Health Organization (WHO). Congestive Heart Failure are expanding day by day because of way of life, genetic problem, blood pressure, cholesterol level, pulse rate etc. So the diagnose of disease plays important role for the prevention of heart related problems. Researchers received different methods to analyze it. These days the utilization of system innovation in the fields of medication zone, finding treatment of disease and patient activity has exceptionally expanded. The aim of this paper is to design a fuzzy rule based expert system for detecting the Congestive Heart failure which assists the doctors to identify disease easily. It is an intelligent decision making system because it provide more accurate result. It consider uncertainty issues like ambiguity, vagueness and imprecision. To accomplish the diagnosis process taken different risk factor, signs and symptoms from patients and experts. Fuzzy rule based consists of four parts such as knowledge base, fuzzifier, fuzzy rule, inference engine, defuzzifier. A membership function was designed and incorporated with the measured value to remove uncertainty.

Keywords: Congestive Heart failure, Fuzzy Inference system, Membership function

INTRODUCTION

In today's world Fuzzy techniques are very famous in medical field also because now there is a need of experienced investigative technique in healthcare industries. Fuzzy is one of the tools which can also be used for many of disease detection such as heart disease, breast cancer and lung cancer, Glaucoma disease etc.

Heart disease explains the range of conditions that affect heart. Many of hazards factors for heart disease for example, age, sexual orientations, hypertension, smoking, family history etc. Heart disease involves various types of conditions that can influence the heart work in which types including heart strokes, heart failure, heart attacks, heart valve disease, cardiovascular disease which is leading cause of death over past few years. It affect heart's muscle, valves or rhythm, also are considered forms of heart disease. Clinical choices are frequently made of in views of specialist and experience rather than to on the knowledgeable data information covered up in database. Patients and doctors need genuine detailed information about the chance of growing heart disease.

Heart disease symptoms can be different in both men and women. For example men will probably have chest pain and ladies will probably have different side effects like shortness of breath, nausea etc. In which symbols include; Chest Pain, Chest pressure, chest discomfort. Shortness of breath.

Pain, weakness, coldness in legs and arms when blood vessels become narrow. Pain in neck, jaw, throat and back.

Risk factors of increasing heart related Age: Increasing age may become risk of damaged and narrow arteries, which affect the muscles of heart.

Family History: Family history of heart disease may increase the risk of heart problems especially in coronary artery disease, if parent develop it in early age (before 55) for male relation such as brother and father and in early age (before 65) for female such as sister and mother.

Gender: Men are having greater risk of heart problem as compare to women.

Smoking: heart attacks are more common in smoking person as compare to non-smoking person because smoking damage the lining of arteries and carbon monoxide in tobacco smoking decreases the volume of oxygen in your blood. So heart has to pump harder to supply the oxygen need to body.

Bad diet: Mostly the heart disease deaths were related with high amount of prepared meat and sugar- sweetened refreshment and low amount of nuts. High stroke hazard was related with low diet of fruits and vegetables and high in salt.

High Blood Pressure: uncontrolled high blood pressure can bring about hardening and narrowing the vessels through which blood flows.

Diabetes: Diabetes expands danger of coronary disease. The two conditions share comparative hazard factors, for example, weight and hypertension.

High Blood Cholesterol level: Large amount of cholesterol in blood can expand the danger of development of plaques and atherosclerosis.

Stress: unrelieved stress may harm arteries and other risk factors of heart diseases.

The analysis of diseases is a essential and complex job in medication. The recognition of heart disease from diverse features or signs is a multi-layered problem that is not free from false assumptions and is frequently accompanied by impulsive effects [5]. Because of the ongoing improvements in the field of expertize, there is no enough examination tools for distinguishing the connections among the information and inside the medicinal services frameworks, there is an accessibility of vast data management tools which results nearly the medicinal data is loose, unverifiable and ambiguous.

The Fuzzy set hypothesis was presented by Prof. Lofti Zadeh in 1965, build to define unattractive data into human reasonable shape. The yielding execution of the Fuzzy logic has been utilized in a wide range of uses. The most critical preferred standpoint of the Fuzzy Expert framework exists in the certain reality that specialists can demonstrate undecided , complex framework into direct human logical kind by utilizing human experience and information as fuzzy logic as the arrangement of linguistic variables. The present paper made reference to a specialist framework by making utilization of fuzzy logic to spot Congestive Heart Failure from its approved symptoms. The precision thinking is resolved using understanding informational collection a record having 6 entirely unexpected properties. By using medicinal expert learning fuzzy rules are created. This present paper arranged learning based master framework for the detection of Congestive Heart Failure.

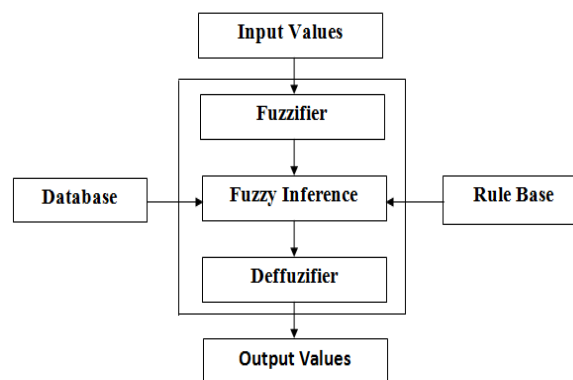


Fig-1: Fuzzy Expert System

RELATED WORK

Nowadays, Fuzzy techniques are widely used in many fields and healthcare applications to solve many issues. Following intends to decompose the fuzzy technologies used by researchers in different way. Different work related with heart disease diagnoses using fuzzy methods have incited the present work. There are various work which have been done by many researcher in past years in which includes; V.Krishnaiah et al (2015) proposed fuzziness in measured data to remove the uncertainty. They classify the patients on the behalf of attributes by using minimum distance KNN Classifier according to the parametric techniques which results to remove redundancy of data with better accuracy.

Sanjeev Kumar, Gursimranjeet Kaur Planned a specialist framework base on worldwide lab information base. Master framework comprises of 6 information and 2 yield fields. Result acquired from planned framework was 92% right. Plan framework was tried by master specialists by which client can without much of a stretch check whether a man have coronary illness or not.

V.Krishnaiah, G.Narsimha et al Examination was passed out by utilizing fluffy and K-NN Classifier to evacuate the vulnerability which results to expel the excess of information with better precision of the framework.

Animesh Kumar Paul, Pintu Chandra shill et al Built up a programmed fluffy indicative framework which depended on hereditary calculation and Modified Dynamic Multi-Swarm molecule Swarm Optimization (MDMS-PSO) for foreseeing the hazard level of Heart Problem. At which it clarify the mix of Fuzzy rationale, GA and Modified DMS PSO can contribute more productive and versatile arrangement of restorative analysis with enhanced exactness of framework. The recreation results portrayed that FS effortlessly adjusts with any informational index and it gave better exactness for every one of the informational collections and viewed as

more effective in the coronary illness forecast. FSs demonstrate a moderately higher execution when contrasted and existing frameworks and thus, portraying a more solid outcome.

Jose Antonio Sanz, Mikel Galar et al Presented the Kx administrator in the IV-FRM to give the framework component to deal with the additional data given by IVFSs .They proposed a hereditary tuning technique that all the while alters both help of upper bound of the IVFSs and the estimation of x parameter for each run the show. After that connected another approach to handle a medicinal determination issue in which patients are ordered by their classification of danger of anguish from Cardio Vascular Disease.

V.Krishnaiah, M Srivas et al Evacuate the vulnerability of unstructured information, Fuzzy K-NN Classifier implanted with representative methodology which results that interim methodology in making information as emblematic information observed to be effective in giving more precision of the framework.

Priyan Malarvizhi Kumar, S.Lokesh et al Proposed another cloud and IOT based Mobile Healthcare application for checking and diagnosing the genuine infection. They build up another structure for open by which another deliberate methodology was utilized for the diabetes and utilizing medicinal sensors for foreseeing influenced individuals. Likewise propose a Fuzzy Rule based Neural Classifier for analyze the infection. This trial was directed by Standard UCI Repository dataset.

R.Chitra, Dr. V.Seenivasagam et al Proposed another unsupervised grouping framework for heart assault expectation at beginning period by utilizing patient's therapeutic record. Right off the bat the patient's therapeutic detail was preprocessed by information mining strategies to expel the copy record and afterward qualities are ordered utilizing Fuzzy C mean classifier. To decide the danger of heart assault 13 qualities were utilized as info. From 270 patients record, effectiveness of classifier was tried which results 92% of characterization precision.

Kaan Uyar, Ahmet ilhen et al Built up a hereditary calculation based prepared repetitive fluffy neural Network (RFNN) to analyze the heart disease.252 out of 297 occasions of patient's information utilized for preparing and 45 of them chose for testing, which results 97.78% exactness from testing set. Moreover they connected root mean square mistake, likelihood, specificity and F-score for estimation to fulfill the outcome dependent on correlations

PROPOSED SYSTEM

In this part, it explains a fuzzy Inference system with capabilities for medical specialty diagnosing is proposed. This system can be a framework that is specialized towards the diagnosis of Congestive Heart Failure with Fuzzy Inference System.

For this reason the system specifies all the input parameters involved in Heart Failure. The fuzzy system allows classifying every membership function of input parameters of all patients by means of their problem as symptoms.

Fuzzy expert framework allows a simple technique for planning a right arrangement with assistance from an uncertain area. The given fuzzy set comparing to membership function characterizes the info credit to its right participation and it should in a range of (0, 1).

$$f(x;a,b,c,d) = \begin{cases} 0 & x < a \\ \frac{x-a}{b-a} & a \leq x \leq b \\ 1 & b \leq x \leq c \\ \frac{d-x}{d-c} & c \leq x \leq d \\ 0 & d \leq x \end{cases}$$

IV. FUZZY WORKING OF INPUT, OUTPUT AND MEMBERSHIP FUNCTIONS

Fuzzy rules are use to convert input variables (Crisp values) into fuzzy variables for the prediction of the problem. Fuzzy IF-ELSE rules are made for INPUT and OUTPUT variables. In this paper the decision making system is performed on MATLAB 2013a software. This projected system is employed to predict Heart Disease. The framework comprises of 5 input variables and 1 output variable taken all through conclusion of Congestive Heart Failure The amount of input variables changes in Blood pressure, Cholesterol level, Blood sugar, old peak, Chest pain. Each input variables is related to two or three membership functions with ranges 0 to 10 and rules are generated in Mamdani Inference System.

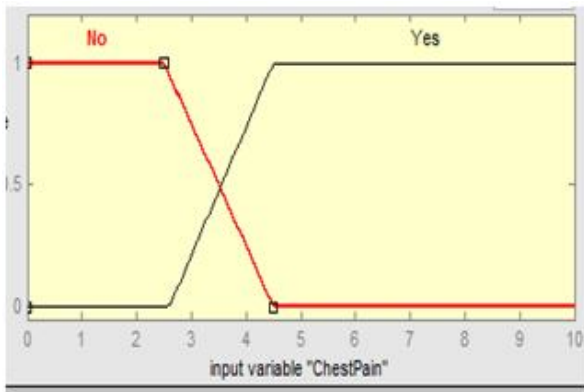


Fig. 2: Membership Plot for Chest Pain Blood Pressur

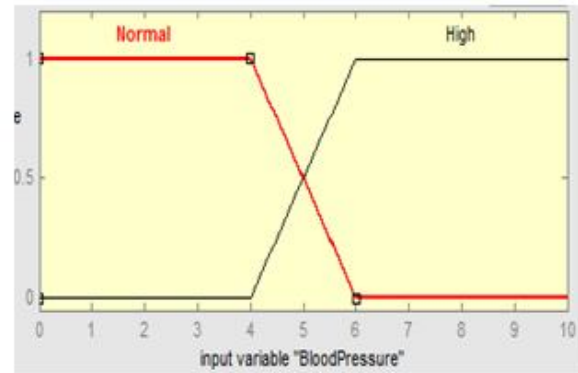


Fig.3: Membership Plot for

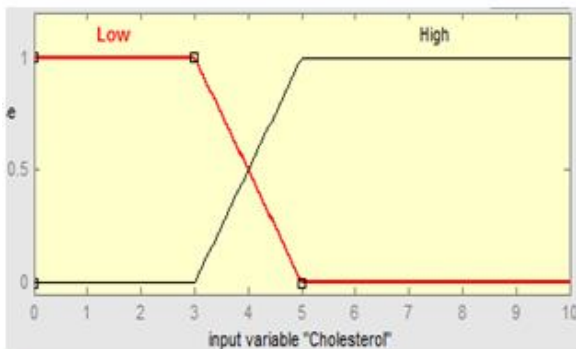


Fig. 4: membership Plot for Cholesterol level

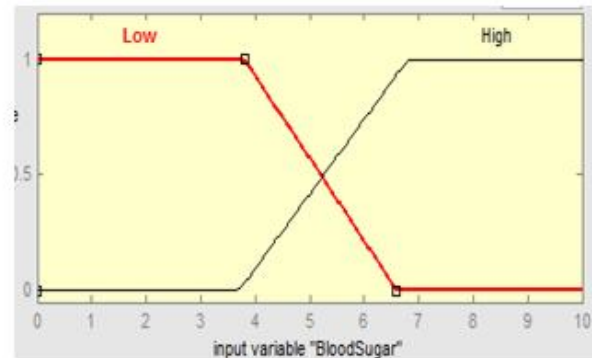


Fig. 5: Membership Plot for Blood Sugar

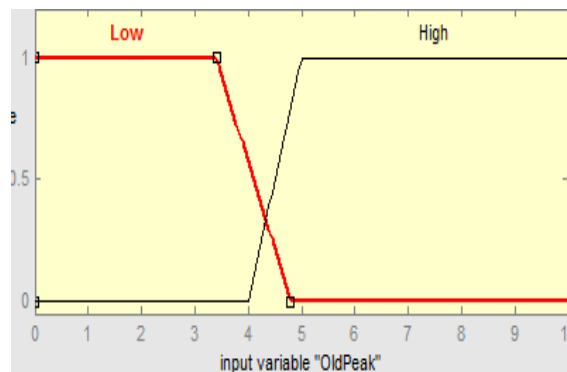


Fig-6: Membership Plot for Old Peak

Fig. 2 present the membership function of Chest Pain which are made up of two membership plot for No and Yes with occur membership parameters values [2.7 4.6 10 10] and not occur membership parameter values [0 0 2.5 4.5]. Fig. 3 present the membership Plot for Blood Pressure which are made up of two membership plots Normal and High with occur membership parameter values [4.1 6.1 10 10] and not occur parameter values [0 0 4 6]. Fig 4 present the membership plot for Cholesterol level which are made up of two membership plots Low and High with occur membership parameter values [3.1 5.1 10 10] and not occur membership parameter values [0 0 3 5]. Fig 5 present the membership plot for Blood Sugar which are made up of two membership plots Low and High with occur membership parameter values [3.7 6.6 10 10] and not occur membership parameter values [0 0 3.8 6.7]. Fig 6 present the membership plot for Old Peak parameter values [4.1 5.1 10 10]

The output is the presence of Chance of Heart disease ranges from 0 to 10. If the Off chance values increases, then it expands the chances of heart illness also. The membership parameter values for output variables in which the chances of heart disease occur are ranges between [3 5 10 10] The Defuzzification plays out the turnaround of fuzzification technique. The Defuzzification changes over the fuzzy output got from inference framework into the crisp variables. Fig. 8 shows the rule viewer of the anticipated framework. It shows the aftereffects of the whole anticipated framework. From the left side at the most elevated we tend to get defuzzified values, we have the tendency get chance of heart disease=6.29 which involve the patient have more chances of heart disease.

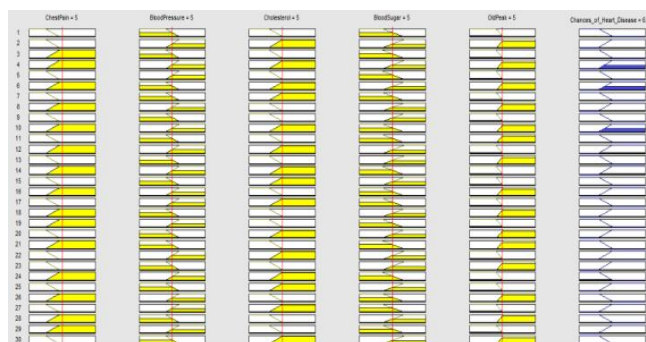


Fig-7: Rule Viewer

CONCLUSION

Fuzzy Inference system is used to diagnose the Congestive Heart Failure in which initially crisp values are converted into fuzzy values which is the stage of Fuzzification. Defuzzification process is conducted to convert the result into crisp values for Congestive Heart Disease status. This process results much better to handle the uncertainty during analysis process. The system can be increased by increasing the number of input attributes. It can likewise be stretched out that framework to have an information which might be utilized for sometime later and references and furthermore to store patient's information. We can plan to design and develop an efficient Congestive Heart Failure system by using significant pattern and artificial intelligence techniques.

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LOCALIZATION IN WIRELESS SENSOR NETWORK USING PSO WITH FLIP AMBIGUITY MITIGATION

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ABSTRACT

Location information of the sensor nodes play a critical role in most of the Wireless Sensor Network (WSN) applications. In this paper we have focused on accurate localization of nodes with effect of flip ambiguity that form the WSN. PSO (Particle Swarm Optimization) is a desirable technique for estimated location optimization because of its fast convergence and lesser computational requirements. A problem often encountered in localization using PSO is flip ambiguity. In this paper we propose a novel technique to reduce the effect of flip ambiguity. After localization, localizable target nodes having more than four anchor nodes in range are upgraded to pseudo anchor nodes. Further, the remaining localized target nodes are checked for flip ambiguity using anchor nodes in short range of communication. Once flip ambiguity is detected, it is reduced using one of these anchor nodes. Finally, we examine a set of properties by which evaluation of localization systems can be done.

Keywords: WSN, Localization, Flip Ambiguity, Particle Swarm Optimization (PSO)

INTRODUCTION

A wireless sensor network (WSN) is a collection of nodes that senses, processes and communicates relevant information. The sensor nodes are generally low cost, low power devices; that have ease of programmability and self-organizing capabilities. Due to the above-discussed advantages, WSN can be used for a wide variety of applications like ranging from military surveillance, healthcare monitoring, environmental, disaster relief, etc[1]. Most applications of WSN require the knowledge of the location of the sensor nodes. Manually recording and entering positions of each sensor node is impractical, where sensor nodes are randomly distributed in large numbers. Seemingly, another simple alternative is to collect data on the location of sensor nodes by means of GPS devices. This is also not a feasible option, both because of the high cost incurred in installing the nodes with GPS receivers and high power consumption of the GPS module that results in reducing the lifetime. Also using an additional module increases the size and weight of the node. Considering the drawbacks of aforesaid solutions, automated localization systems that can assign geographic coordinates to each node, were developed. Most of these schemes require inexpensive and easily available hardware, which have minimal energy requirements, and can scale to large networks. They achieve good accuracy even in the presence of irregularities and are capable of giving the solution in less computation time.

For localization a prior knowledge of position of a few nodes (called anchor nodes) is required and position of the remaining nodes (target nodes) is computed with the help of these anchor nodes. The localization techniques can be classified in different ways [3], based on range information (range based/range free), based on existence of anchor nodes (anchor based/anchor free), based on computation method (centralized/ distributed), based on mobility (static/dynamic), etc. In [2] it has been suggested that localization systems can be divided in three distinct components – estimating the distance/angle, computing the position and applying the localization algorithm. Distance/angle estimation can be done by using techniques like ToA (Time of Arrival), RSSI (Received Signal Strength Indicator) and Time Difference of Arrival (TDoA), etc. Methods like trilateration triangulation, centroid, etc. are used for position computation.

Localizing target nodes using above discussed methods results in high mean localization error. Recently, the prevalent strategy is the application of optimization algorithms to solve the localization problem. Classical optimization techniques are not suitable for localization in WSN because of its complexity. Evolutionary algorithms like SA (simulated annealing), BBO (Biogeography Based Optimization) and PSO (Particle Swarm Optimization) are becoming prevalent because of less computational requirement and provision of good results. A problem sometimes encountered in using these algorithms for WSNs is that of flip ambiguity. The main contribution of this paper is: It presents a novel technique to reduce the setback of flip ambiguity for localization using PSO for distributed localization system.

Section II presents an analysis of the related work, which has been done on optimization of obtained node

Location of WSN using PSO algorithm. Section III describes the proposed protocol. Simulation results performed on matlab are reported in Section IV. Finally, in Section V conclusions are presented.

RELATED WORK

A detailed survey of issues in WSNs is available in [4]. Herein PSO and its suitability for applications in WSNs is discussed. In [5] it is proposed for PSO to be used for localization in WSN, as a stochastic global optimization tool, that minimizes the objective function, avoids being trapped in local minima, thus reducing the mean localization error significantly. The scenario assumed in [5] is centralized architecture for WSN. The applications of a variant of PSO called H-Best PSO (HPSO) and an evolutionary algorithm, Biogeography Based Optimization (BBO) algorithms are proposed in [6] for randomly deployed sensors (scenario presumed is distributed) to obtain optimal localization. This paper concluded that HPSO and BBO yields better performance in terms of faster and accurate localization as compared to traditional PSO. Experiment simulation, comparison and evaluation are conducted for node localization using six variants of PSO in [7]. It proposes two new variants PSO: Gauss Dynamic PSO and Logistic Dynamic PSO and concludes that these variants perform well for node localization problem. In [8] the problem of flip ambiguity is discussed and it is suggested that the localization problem can be solved by using a two objective evolutionary algorithm. During the evolutionary process it concurrently takes into account the localization accuracy and some topological constraints imposed by the network connectivity. This helps in further reducing the localization error. In literature [9] a distributed two-phase PSO algorithm is proposed to reduce flip-ambiguity. In the first phase search space is defined by bounding box method and in the second phase error due to flip-ambiguity is corrected. Simulation results indicate that this method localizes more unknown nodes with higher precision. In [12,13] location optimization for mobility based scenarios with single anchor node has been proposed using PSO, HPSO (hybrid PSO), BBO (Biogeography based optimization) and FA (Firefly Algorithm).

PARTICLE SWARM OPTIMIZATION

1.1 Basics of PSO and Its Application in Localization of WSN

PSO is a bio-inspired evolutionary technique facilitating global search. Eberhart and Kennedy [10], developed it based on the social behavior of a flock of birds where each individual learns from its own experience and the experience of its neighbors. In PSO a set of feasible solutions, called particles are deployed within the search space. Corresponding to each particle location, objective function is calculated. PSO could be used for minimization or maximization of an objective. For WSN localization application, PSO is used for minimization.

The particles are moved in the search space following the behavior of a flock of birds. Each particle moves towards the best position that it has encountered so far (pbest) and the best position obtained by the entire swarm (gbest).

In a D-dimensional search space, where the size of the swarm population is M, the position and the velocity of the kth particle can be represented as $X_k=[x_{k1}, x_{k2}, \dots, x_{kD}]$ and $V_k=[v_{k1}, v_{k2}, \dots, v_{kD}]$ respectively. $P_k=[p_{k1}, p_{k2}, \dots, p_{kD}]$ gives the best position ever visited by the kth particle and the position vector of the best particle in the swarm is given by $B=[b_1, b_2, \dots, b_D]$. In every iteration, l each particle in the search space evolves according to equations

$$v_{kd}(l+1) = \omega v_{kd}(l) + c_1 r_1 (p_{kd} - x_{kd}(l)) + c_2 r_2 (b_d - x_{kd}(l))$$

(1)

$$x_{kd}(l+1) = x_{kd}(l) + v_{kd}(l+1)$$

(2)

where $d=1, 2, \dots, D$ and $k=1, 2, \dots, M$. ω is the inertial weight. Its value decides the speed of convergence. A small value results in an early convergence whereas larger values slows down the process of convergence. c_1 and c_2 are the cognitive and the social learning parameters, that determine the speed at which a particle accelerates towards its pbest and gbest respectively. r_1 and r_2 are uniform random numbers in the range [0,1]. Eberhart and Shi in [11] recommended a value of $\omega=0.7$ and $c_1=c_2=1.494$ for fast convergence.

3.2 Limitation of PSO for Location Optimization

A phenomenon known as flip ambiguity (shown in Figure 1) is encountered in localization using PSO. If there are three or four near collinear anchor nodes in range of a given target node a point in the search space may exist that has minimum objective function, but is flipped along the line connecting the neighbor anchor nodes. In Figure 1 Target Node T_1 is localized using anchors A_1 , A_2 and A_3 . The anchor neighbors of T_1 are near collinear, hence even if the position of T_1 is obtained at T_1' , as the objective function of the two positions is almost equal, it may lead to wrong localization of T_1 at T_1' .

3.3 Proposed Methodology to Remove Flip Ambiguity

An efficient method for localization in WSNs has been proposed in order to overcome the problem of flip ambiguity

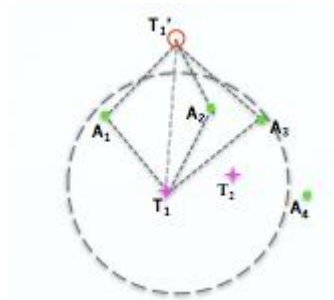


Figure-1: Problem of Flip Ambiguity

Algorithm of proposed protocol

- Deploy m anchor nodes and n target nodes in a given area
- Find the number of anchor nodes in communication range of a given target node. The distance between the target and the anchor is measured as

$$d_i = \sqrt{(u - u_t)^2 + (v - v_t)^2} \quad (3)$$

Due to environment consideration, the distance measurement is corrupted by additive white Gaussian noise n_i and is given by

$$\hat{d}_t = d_t + n_t \quad (4)$$

(u, v) is the co-ordinate of the target node and (u_t, v_t) is the co-ordinate of the tth anchor node.

- If the number of anchor nodes in range are less than three then the target node cannot be localized.
- If the number of anchor nodes in range of target node are three or more than three then the target node can be localized.
- If the target is localizable, the centroid of the anchor nodes in range of the target is found.
- Particles are deployed around the centroid.
- PSO algorithm is applied to optimize the obtained node location and minimize the objective function:
- $f(u, v) = \frac{1}{M} \sum_{t=1}^M (\sqrt{(u - u_t)^2 + (v - v_t)^2} - \hat{d}_t)^2$
- After all the localizable target nodes are localized, the targets having more than four anchor nodes in range are upgraded to the status of anchor nodes (pseudo anchor nodes).
- Targets with three and four anchor nodes in range are checked for flip ambiguity.
- This is done using short-range communication.
- Short-range anchor neighbors of the targets (having three or four anchor nodes in range) are obtained and its distance with the target is calculated using equations 3 and 4. Their distance with the localized position is also computed.
- If this distance is more than the distance considered for short range communication the target is assumed to be wrongly localized with flip ambiguity.
- Once the flip ambiguity is detected the nearest anchor neighbour of the target is taken as reference to deploy particles for applying PSO algorithm.
- Target is re-localized correctly

SIMULATION AND RESULTS

The WSN localization simulations were carried out in MATLAB. The number of target nodes was fixed to 100 in an area of 20×20 unit. Population size of the swarm for PSO algorithm is fixed at 20. The number of maximum iteration is 100.

- a) No. of Anchor Nodes: 5 to 20
- b) Maximum Range of communication: 8 and 10
- c) Gaussian Noise: 2 to 8
- d) In Figures 1, 2 and 3 green dots represent anchor nodes, pink asterisk represent the target nodes and the red circles represent the estimated location of the corresponding target nodes. The yellow lines represent the error in localization that is the distance between the actual position and the estimated position of the target node. As can be seen in figure 2 (simulation result of localization using traditional PSO algorithm), the localization error is high due to flip ambiguity phenomenon. Figure 3 shows the simulation result of the proposed method in this paper. As can be seen in figure 3 the localization error due to flip ambiguity has been rectified.

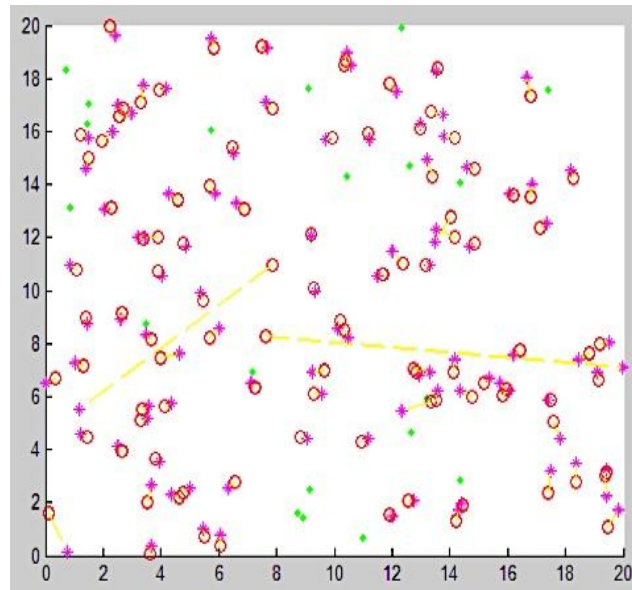


Figure-2: Simulation Scenario for localization in WSN using PSO

Gaussian noise is an important parameter for distance measurement, which in turn affects localization accuracy. In order to compare the three methods, i.e. location optimization using PSO without removing flip ambiguity, existing method in literature to remove flip ambiguity and the proposed method to remove flip ambiguity, the dependence of mean localization error on Gaussian noise variance is plotted in Fig. 4. It can be seen in the figure that the localization error increases with increase in added noise, but the performance of the proposed method is better as compared to the existing methods.

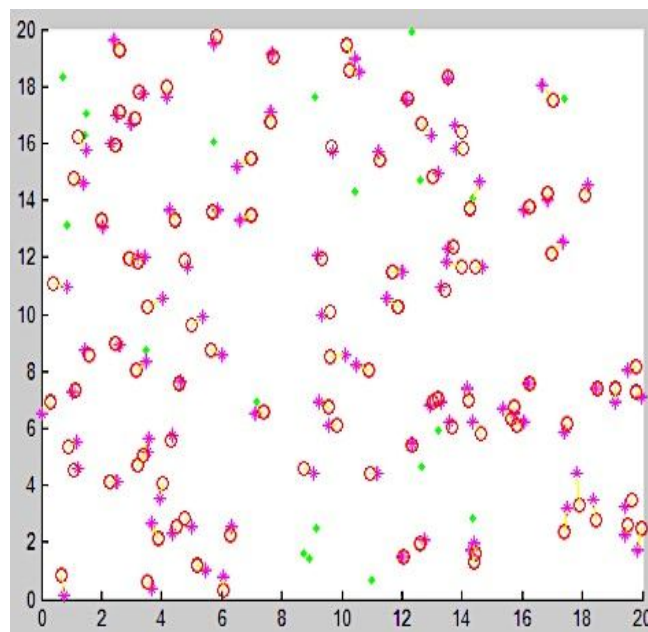


Figure-3: Simulation Scenario for Proposed Method to Remove Flip Ambiguity

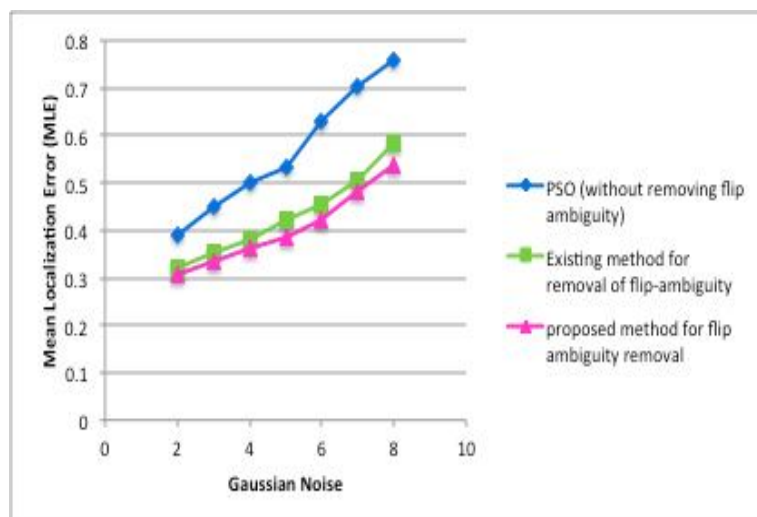


Figure-4: Mean Localization Error vs Gaussian Noise.

The number of Anchor nodes and the transmission range are other important parameters affecting the localization efficiency. The performance of localization algorithm (in terms of mean localization error) as a function of number of Anchor nodes, varying the transmission range is depicted in Fig. 5. The mean localization error decreases with increase in number of anchor nodes but after an extent there is no change in performance.

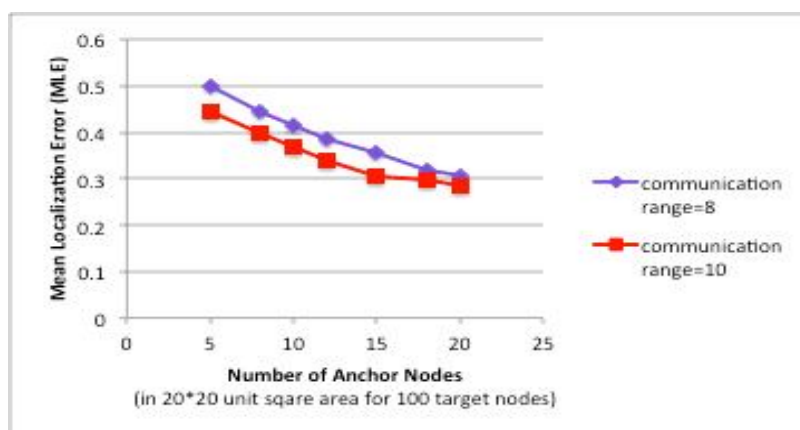


Figure-5: Mean Localization Error vs Number of Anchor Nodes.

CONCLUSION AND FUTURE WORK

In this paper a new technique is proposed and analysed to remove the problem of flip ambiguity arising during localization using PSO. From the above results and discussions it can be concluded that the proposed method provides better localization performance in terms of localization accuracy as compared to the existing methods in literature. Since short-range communication is used in the improvement phase, the energy requirement for improving localization efficiency is also reduced. In future the energy requirement for localization for the methods discussed can be computed and compared with each other and the latest research works.

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