

ANTECEDENTS OF ONLINE SHOPPING INTENTION-A REVIEW OF LITERATURE AND CONCEPTUAL MODEL

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ABSTRACT

The Internet and other technologies have given marketers access to a whole new set of tools. Online business to consumer trade is one of the fastest-growing markets. There are several options for marketers to promote their goods and services thanks to the internet. These possibilities, on the other hand, come with a number of significant drawbacks. Online merchants and website developers must grasp the customer's point of view on the aim of online shopping in order to capitalise on possibilities and build strategies to cope with difficulties that are prevalent in the e-commerce sector. Understanding what motivates consumers to purchase online is critical. As a result of this the study presented a theoretical framework for consumers' online buying intentions. Consumers' online buying intentions for consumer electronic items were studied using behavioural intention theories to build a conceptual model.

Keywords: Purchasing intention, conceptual model, e-tailing, online shopping, Literature study.

1. Introduction

When customers buy online, their purchasing habits are impacted by the choices they make regarding the products or services they wish to purchase. Online shopping is the process through which customers purchase goods and services directly from vendors via the internet. This is e-commerce in the sense that the customer buys directly from the seller. According to previous research, consumers intend to purchase online when they go to stores. This is a measure of how often a person plans ahead and makes decisions about whether or not to do something in the future. The willingness of customers to make purchases online is crucial to the growth of e-commerce.

Another source claims that consumers want and need to do business online. Online buying is a long-term cognitive approach for the customer. In addition, the purpose to buy online includes both the adoption and acceptance of online purchasing. Adoption of the internet by customers refers to their initial online purchase, whereas acceptance refers to their subsequent purchases or approval of the online channels by frequent customers. There is a discrepancy because buyers' opinions of e-commerce are influenced by their online shopping experience. Prior research suggests that customers' behaviour intention may be successfully utilised to anticipate actual behaviour. In addition, it showed that the urge

to buy online has a substantial impact on purchasing decisions. Online purchasing intention must be examined by marketers in order to anticipate real purchase behaviour and create effective marketing strategies. In this context, the research seeks to examine theories of intention and analyse the factors influencing online purchasing intents in a proposed conceptual model.

2. Research Questions

The Paper Proposed Two Major Research Questions to Achieve Its Goal of Developing a Conceptual Model. The first concern is with behavioural intention theories. The second issue relates to the identification of variables that affect the customer to purchase or not to buy from the online platform.

The following are the paper's research questions:

- ❖ What are the most widely accepted ideas in the literature on the subject of online buying intentions?
- ❖ Consumers' online buying inclinations are influenced by a number of variables.

3. Research Methodology

Online shopping encompasses a wide range of topics, including information technology, computer science, management, consumer behaviour, and marketing. Many studies have been done on people's intentions to purchase online. Even so, the researcher hasn't done any specific product or service-specific research on

internet buying intentions. In other words, in order to come up with the proposed conceptual model, the authors dug up research from highly referenced electronic journals. In order to find prior publications, we used keywords like "online shopping intention," "online shopping adoption," "online shopping acceptability," and "and online purchasing intention."

The main databases utilised for collecting research articles are Emerald, JSTOR, Science Direct, and Springer. Afterwards, these papers are carefully analysed in order to discover the key behavioural intention theories in an online buying context and to determine the elements impacting an online purchase intention. In addition, the research articles sorted by the link between the variables discovered serve as a reference for future study. The taxonomy of past research articles was also developed to better comprehend the underlining characteristics in each research article scenario, such as its location, product and service, period of study, situational aspects and demographics. Sample size, equipment used for analysis, etc. Finally, the study provided a conceptual model for shoppers' online buying intentions, complete with hypotheses.

4. Theoretical Framework For Consumers' Intention

4.1.Theory of Reasoned Action (TRA)

In 1975, Fishbein and Ajzen created the reasoned action model hypothesis. To put it another way, the model shows how a person's intentions and conduct are linked to his or her subjective standards of behaviour. According to this concept, an individual's conduct is determined by their goal, and their intention is in turn determined by their attitude and personal standards. In addition, attitudes are shaped by a person's beliefs, whereas subjective norms are shaped by a person's normative beliefs and their desire to adhere to them. The TRA model is a powerful tool for determining how someone intends to act on a specific decision.

4.2.Theory of Planned Behaviour (TPB)

Ajzen developed a theory of planned behaviour by building on TRA (TPB). Perceived behavioural control motivates an individual's goal in this approach. Resources and talents, as

well as the impression of an individual's capacity to attain goals, are all considered. Self-efficacy and perceived behavioural control are intimately linked. TPB has already been shown to be more effective when it comes to technology adoption.

4.3.Technology Acceptance Model (TAM)

As a result, the Technology Acceptance Model was developed using TRA and TPB theories (TAM). The model is a modification of the preceding two models to explain a specific type of behaviour - the usage of technological devices. TAM is a well-researched, strong, and reliable methodology for assessing whether a new piece of technology will be accepted by its intended audience. To a greater extent, TAM focuses on the estimation of an information system's acceptability. The model's goal is to forecast the adoption of a certain information technology and recommend adjustments that need to be made to the information technology in order to improve acceptance.

The concept applies to a wide range of end-user computer technologies and user demographics and may explain user behaviour in those contexts. Perceived usefulness and perceived ease of use are key factors of technological acceptance. Perceived usefulness measures how much a person feels that using new technology will boost performance. Perceived ease of use refers to the degree to which a person feels that using information technology would be effortless. Perceived usefulness has been found to be a stronger predictor of desire to utilise information technology than perceived ease of use.

Perceived ease of use has a direct impact on perceived usefulness. In other words, perceived utility is important, but it's secondary to ease of use. The TAM model has been enhanced by includes new factors including subjective norms, voluntariness, imagery, work relevance, output quality, and the capacity to demonstrate results. TAM2 is the model name for this particular vehicle. TAM2 was shown to be more durable than TAM in both a required and voluntary setting, according to a prior study. Venkatesh and Bala created the TAM3 model in 2008. The TAM3 model, which has four key antecedents like facility condition, now includes the drivers of perceived usability.

societal impact, system features, and individual variations among users are all factors to be considered. TAM3 was discovered to be used in prior studies to assess IT adoption and implementation. Electronic commerce adoption and implementation contests can also benefit from using the model.

4.4. The Unified Theory of Acceptance and Use of Technology (UTAUT)

The unified theory of technology acceptance and usage (UTAUT) is a technology acceptance model. The model is primarily concerned with how people will accept new information when it is presented to them. The model's goal is to figure out what the user wants from technology and then how they act when they get it. Social influence, effort expectancy, performance expectancy, and enabling conditions are all important antecedents to the UTAUT model's performance expectations. The model's moderating factors include experience, age, and gender, which all have an effect on the connection between the four categories and the intention. There are numerous elements that influence whether or not an individual intends to carry out a given task, as discussed above in relation to various behavioural intention theories. Study of TAM models found that perceived ease of use and perceived usefulness, subjective norms, previous experience and performance expectations, effort expectations and facility condition are the major factors that directly or indirectly influence the user's intention based on the study of TRA, TPB, TAM and UTAUT. Additionally, gender, age, and whether or not the usage was voluntary were all found to be significant moderators of intention.

5. Determinants of Online Shopping Intention

The paper's goal is to better comprehend and build a conceptual model of consumer electronics online buying intentions. The conceptual model for the study was developed using TAM and UTAUT model variables as a foundation. Many previous researches have determined the validity and robustness of these two theories in various technology-related settings. According to prior research, this portion of the article explored different

antecedents of customer online buying intention. This will serve as a foundation for the creation of a conceptual model for consumer electronics goods online buying intentions.

5.1. Perceived Risk

The degree to which a client believes there will be bad results from an online transaction is known as perceived risk. Perceived risk is the degree to which a user feels that using the internet is hazardous or may have negative effects in the context of online purchasing. Customers' online intentions were shown to be influenced by their perceptions of risk while making purchases in the digital world. Psychological, social, financial, performance, physical, and opportunity cost risk were all found by the researchers. In another study, the author found that financial risk, information risk, and product risk were all significant. When clients have to choose between two options, they often feel resentful. Customers may hesitate to make an online purchase since the perceived risk is greater than with more traditional marketing methods. Due to the previously stated obstacles, customers are more aware of the potential risks associated with shopping online. Perceived danger comes in two forms when it comes to internet buying. One is the risk of the goods or services itself, and the other is the privacy and security risk of conducting business online. Perceived risk may also be defined as the unfavourable repercussions that customers expect when they buy a product or service online. Customers' behaviour is adversely affected by their perception of risk, according to Rizwan and colleagues. Customers' online shopping behaviour is influenced negatively by their perception of danger.

5.2. Trust

Both philosophically and experimentally, trust in internet businesses has been established. Measures how much confidence clients have in retailers that sell to them online and how that affects attitudes towards doing business with them. Trust has a direct and beneficial impact on the desire to do online buying. Customers who have confidence in an online vendor spend less time researching the seller and less time

completing the online purchase. Customers might overcome their fear of online purchasing, which is derived from the perceived risk, by developing confidence in a website or even in the entire online shopping ecosystem. If the retaining party is on the web As long as the online merchant can't be relied upon to act in accordance with consumers' confident expectations, there's no reason for them to expect anything in return for using the interface. Buyers avoid internet purchasing because they are distrustful. The more customers trust their online retailers and feel that online buying is convenient, the more likely they are to believe that it's worthwhile to do their shopping online. When it comes to many transactions, trust is crucial in helping people overcome their fear of taking a risk. Another study found a negative correlation between trust and how risky one thinks one is. As a result, trust is a powerful indicator of e-commerce users' desire to transact.

5.3. E-shopping Quality

Customers frequently anticipate e-commerce help from websites. As an instance, they may call for detailed information on a certain product or service, a dependable website for obtaining that product or service, and excellent customer service. Expectancy-value method defines online purchasing quality as the perceived quality of information, quality of a system and service quality. The success of an online shopping website is determined by these three criteria for assessing a website's quality. Previous research also shows a strong link between customer views of the quality of online purchasing and their level of confidence in the retailer.

5.4. Perceived Enjoyment

Perceived pleasure has a big impact on whether or not a person intends to use an electronic device. The amount to which utilising an e-commerce website is pleasurable in and of itself, apart from the instrumental benefit, is known as perceived pleasure. It's a critical component in the adoption of online buying. Shopping enjoyment is described as "the

5.7. Perceived Behavioural Control

To what extent people believe they have control over a particular activity (such as

amount to which one feels that shopping will give reinforcements in and of itself, extending beyond performance consequences such enjoyment extends to the online channel." Customers are self-determining and organically driven to purchase online when they are interested or like doing so, according to self-determination theory. Given that most online shopping is done on a whim, with impulsive actions like looking and purchasing, it stands to reason that customers' intentions will become stronger if they feel greater satisfaction from the website. Perceived pleasure affects behaviour in a direct way.

5.5. Subjective Norms

Individuals create behavioural intentions based on attitudes toward conduct and perceived subjective standards according to the idea of reasoned action. Individuals' subjective drive to act in accordance with the opinions of their peers and social group is governed by subjective norms. Subjective norms refer to a person's view of the societal constraints that are placed on them to carry out the conduct in issue. That is to say, it pertains to one's personal assumptions about what those around them would think of the conduct and the incentive to follow such assumptions. Prior research has shown that people use shopping websites based on the opinions of their social networks.

5.6. Previous Experience

Customers' propensity to purchase online is influenced directly by their previous online purchasing experiences. Customers are more likely to make repeat purchases if they have more familiarity with online buying and are happy with previous online transactional experiences. Customers' perceptions of utility, convenience of use, and enjoyment may enhance if they have a positive experience, while the perceived danger of online purchasing may decrease. Customers' perceptions of the internet as a shopping medium improve when they gain experience with it.

online shopping) or reaching a behavioural goal is linked to their sense of behavioural

control. It's separated into two distinct categories:

Confidence in one's ability to succeed (internal factor)

A situation that encourages progress (external factor).

People's trust in their own abilities shows their self-efficacy; whereas facilitating conditions show how much infrastructure they feel is in place to help them use a system. Information technology adoption is influenced by how much control users feel they have over the system. When people think of technology as Perceiving that technology is within their control gives customers the impression that they have more control over the job process, which in turn increases customer trust in the end result. Consumers are less likely to use new technology if they believe they have no

control over it. When it comes to e-commerce, the person making the purchase must be confident in their ability to use and handle the information technology. Other judgments such as ease of use and usefulness are influenced by self-efficacy, which in turn influences ultimate behaviour.

8. Discussion

On the basis of the discussion above and prior studies, the study attempts to determine the link between numerous characteristics related with online purchasing intention. This connection is summarised with respect to the relevant body of literature. It would lead to the creation of a conceptual model (see Figure 1) which could then be empirically evaluated. The following hypothesis is based on the conceptual model that has been proposed.

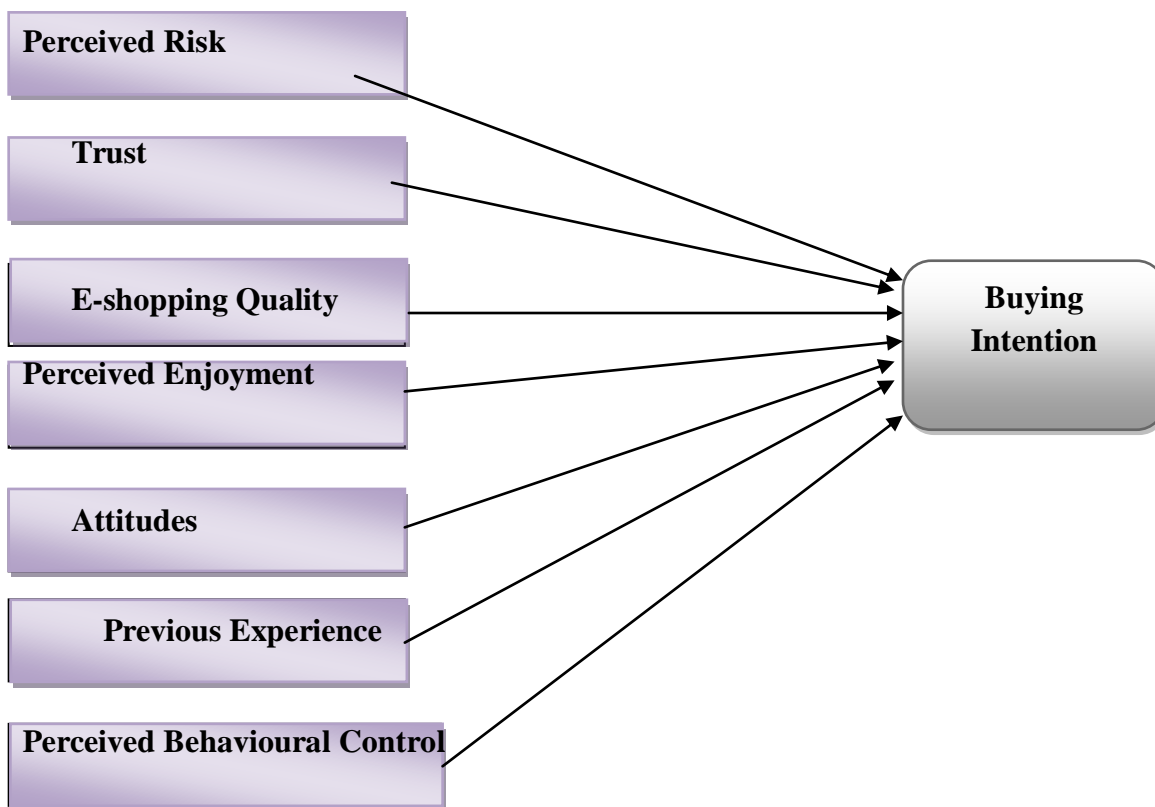


Fig. 1: The Proposed Conceptual Model.

Based on the proposed model the following directional hypotheses are proposed, the validity of the proposed hypothesis are subject to empirical test adopting appropriate methodology.

1. There exist significant association between the perceived risk and buying intention of the consumer
2. The trust of the consumer significantly influences the buying intention of the consumer

3. There exist significant relation between E-shopping quality and buying intention of the consumer
4. Perceived enjoyment significantly associated with buying intention
5. Attitude towards online shopping significantly influences their buying intention
6. Consumer's previous experience significantly associated with buying intention
7. Perceived behavioural control significantly influences buying intention

9. Conclusion

The goal of the research was to develop a conceptual model for consumer electronics goods online buying intentions. As a foundation for predicting behavioural intentions, researchers often employ four intention-related theories: theory of reasoned action; theory of planned behaviour; model of technology acceptance; and the unified theory of technology acceptance and usage. TAM and UTAUT were shown to be the most accurate models for predicting future online buying behaviour. As a result, the suggested conceptual model was constructed by taking these two models and their predecessors into account broadly.

Perceived risk, trust, e-commerce quality, subjective norms, perceived behavioural control, and perceived enjoyment have been found to be key antecedents to understanding customers' intentions for online buying in prior

studies. Prior research has also revealed that the majority of studies have focused on measuring the intention to shop online in general, while only a few have attempted to measure the intention to shop online for a specific product or service, such as travel, music, trading systems, games, apparel, financial services, and so on and so forth. Accordingly, the study recommends applying the conceptual model to understand customers' online shopping intentions for consumer electronic products, as this is the most popular product category sold online. This includes looking at perceived risk, behavioural control, e-shopping quality, and enjoyment perceptions as antecedents to online shopping intentions. Based on the proposed model directional hypotheses are proposed, the validity of the proposed hypothesis are subject to empirical test and adopting appropriate methodology.

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IMPACT OF DEMONETISATION ON INDIAN STOCK MARKET WITH SPECIAL REFERENCE TO NSE

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ABSTRACT

Stock Market is considered as the best investment alternative and it attracts many investors, but the risk factor is also more as there are lot of determinants of the stock market. The prices in the stock markets are being influenced by various micro and macro-economic factors, but at the same time, the macro-economic factors play a vital role in stock market movements. The main aim of the present study is to analyse the movement of Nifty index due to demonetisation event. The secondary data have been used for the study. The index i.e., Nifty 50 have been taken for the study. After the collection of data, the data pertaining to pre and post demonetisation were identified for all the periods under study for the analysis and comparison. Statistical tools such as Graphical analysis, Descriptive Statistics, CAGR, Parametric test and non-Parametric test have been extensively used in the study. Paired t-test is used where the data are normal and Mann Whitney where the data are not found to be normal. The findings show that the Demonetisation has a statistically significant influence on Nifty 50. The CAGR of Nifty 50 index reacted negatively for One-month analysis, significantly increased for three-months, six-months, twelve-months and given a mixed reaction for thirty-months.

Keywords: Demonetisation, Annualised Return, Volatility, Paired t-test, Mean-returns.

Introduction

Investment is the allocation of present holdings of money in the expectation of good return or benefit in the future. There are lot of investment avenues available with the investor. Investors typically expect better returns on risky assets. If a low-risk investment is made, the return is often usually small and likewise, high reward comes with high risk. The good investment is the one which is characterised by the Safety of Principal, Liquidity, generates constant income i.e., Stability, hedge against inflation and consistency in purchasing power. The investment opportunities in any countries are largely based on its financial system. Financial Securities is treated as the evidence for the investors to claim the amount invested at any time in the future and to earn annual return in the form of dividends and interest etc. Capital Market is a mechanism through which small and dispersed savings of the surplus units are channelled into productive and profitable corporate activity for the long term. It also provides investors with the important characteristics of liquidity, marketability, and safety of the money invested. A well-regulated capital market helps the economy's long-term growth. The regulatory body and the government try to bring qualitative reforms in the capital market for more transparent structure. A country's stock market is seen as a barometer of its economic growth and it serves as a channel for

obtaining fund from interested investors, which are then used to fund industrial expansion, which leads to company expansion also. Market environment decides the price of the stocks and volatility in the prices of the shares causes to fluctuate the market index. The stock market provides the opportunities to the investors to have ownership in the company in exchange of providing access to capital to the companies. The Indian economy witnessed the shocking moment, when the “**PM Narendra Modi**” announced the demonetisation on 8th Nov 2016. The Currency notes of ₹500 and ₹1,000 which accumulates 86% in value, of all currency notes in circulation would no longer or ceased to be a legal tender. The ultimate objectives were unearthing shadow money, cracking down on bogus currency, and striking terrorists’ economical backbone. Demonetisation is the process of removing a monetary unit's legal tender status and it is also defined as the demonetized notes are no longer legal tender, and the new designed money will replace the old currency unit. However, there were strong reactions both in favour of and against this extraordinary move, which would come to be known as ‘Demonetisation’ or ‘Note Ban’. Demonetisation has been used to modernise a cash-based developing financial system to battle against corruption, counterfeiting, and tax-evasion. One of the most compelling reasons for individuals to support Demonetisation was the fact that it was linked

to ending India's black money problem. The findings revealed that the hoarders either discovered a way to legitimate their black money or did not store it in the form of cash. The individuals and businesses possessing significant amounts of black money derived via parallel cash structures were forced to take their large-denomination notes to a bank, which was required by law to collect tax records on them. Even though the demonetisation operations were a haphazard attempt to curb black money in the economy, they have instilled suspicion in the minds of those who hold black money. Demonetisation was a last-ditch effort to combat black money, terrorism, and corruption, among other issues. However, this time Demonetisation proved to be more victorious than the previous two in the past. Demonetisation is being executed by expecting the positive changes on the liquidity structure in the economy and the nation often adopts this step as a measure to improve the economic conditions and prevent from the parallel economy. Demonetisation occurs when the legal tender status of a currency component in circulation is revoked by a regulatory body. This can happen if an economy is fighting inflation or deflation, or if there is a flaw in the economy, such as corruption, black money, or undeclared transactions. Demonetisation is also used to hamper the cash-dependent economy or encourage trade with cashless transactions. Demonetisation is which an old currency is replaced with a new currency or a currency's circulation is halted. Several motives to demonetise the currency; that consists of lowering inflation, reducing corruption, and promoting cashless transactions, which brings transparency to all the country's existing legal transaction modes and boosts the country's economic development.

Demonetisation and the Stock Market: Establishing a Relationship

Demonetisation is being seen as macro-economic change in the Indian Economy and its effect on the share market invariably shares its boundaries across all sectors listed in Indian stock market. The phenomenon has been substantively for stock market and there is also a need to study to take an insight of how the act

of Demonetisation relates with that of stock market. The relationship ascertains the economic health of the country. There are two forms of risk affecting the stock market: systemic and unsystematic risk. The Demonetisation reflects a systemic risk distributed through the Indian stock market with all the securities and indices reflecting their impact size. The Demonetisation step has influenced the purchasing power which was demonstrate its effect on various sectors. It is the matter of research that the quantum of the effect of demonetisation on a particular sector. The bank is the sector which is going to be directly influencing with the move. Banking sector will become the main demonetisation beneficiary as its large capital flushed. If the bank is not able to effectively lend the collected money will lead to increased NPA. The Demonetisation is the start of the era of digital payments and the government will do all in its power to make India a cashless economy. The operating efficiency of the banks will also have a positive impact. Stock Market observes and react evenly to the small events as well as to the changing government's policies and the demonetisation is one of the macroeconomic decisions which affects every household and the businesses of the country. There are much needed efforts required to analyse and capture the counter reactions made by the stock market to the demonetisation. The BSE Sensex fell by roughly 1,688 points, or 6.12%, the day after the Demonetisation decision, and the Nifty 50 fell by 541.30 points, or 6.33%. Following the announcement, the rupee was valued at 66.22 for each US dollar, and about 23 paise were reduced. The stock market depends heavily on political, economic, and environmental stability in the nation and in the globe as well. The detrimental effect on the stock market after Demonetisation is slowly rebounding back to normalcy. Government revenue would improve with accounted money through the collection of taxes. Taxation has also been one of the main sources of government revenue. That's why the finances of the government should increase. Moreover, with a reduction in the use of paper notes, millions of rupees will be saved due to especially when combined with GST, Demonetisation and digital payment reforms

will also strengthen India's world ranking in terms of ease of business. It would also encourage new companies and FDI as it is another source of government revenue. However, medium-and long-term benefits will outweigh these short-term negative impacts and enable India to grow into a corruption-free nation state with greater accountability and public power. Debt mutual funds can be a better alternative in the situation of falling interest rates. Despite stock markets dropping due to Demonetisation uncertainty, one can invest in strong equity mutual funds at a low price and expect decent returns from equity mutual funds in the long term. Moreover, in the long-term, the mutual funds are supposed to benefit from Demonetisation. With the banks bringing down fixed deposit rates soon, more investors will move their savings into mutual funds to hedge the inflation rate. When good equity mutual fund firms invest in strong stocks, with a small price investment one would expect to get a good return. The mutual fund sector surely going to benefit in the long run from the elimination of the ₹500 and ₹1000 notes. Banks shall pay less interest on fixed deposits, as a result citizen may opt to invest in mutual funds schemes to yield more than inflation. The contribution towards the mutual funds may be enhanced due to lesser interest rates in Banks. After the enormous social media heat both for and against Demonetisation, the stock market has reacted badly to Demonetisation and opened lower. Volatility, too, is slowly calming down, which is good for the stability of the market. Normalcy is shifting back to both the stock market and the economy. India would need at least Twelve months, if not more, to recover completely from this move. Furthermore, the long-term benefits are much too significant, particularly for the stock markets.

Review of Literature

The review aids in identifying the research gap that exists in the field. It also provides an opportunity to talk and discuss about the approaches that have been employed in the literature and how it could be connected to the approach one has selected in his/her research. Some of the relevant studies undertaken for review.

Agrawal, G, et.al. (2010), conducted his research on “*A Study of Exchange Rates Movement and Stock Market Volatility*”. The outcome shows unidirectional causality from stock returns to exchange rates, leading to the conclusion that an increase in Nifty returns caused a reduction in exchange rates, but not the other way around i.e., not hold good for vice-versa. **Bantwa, A (2017)**, conducted his research to study the short-term impact of demonetisation decision on Indian stock market as represented by Nifty index of NSE and on various sectors of Indian economy. **Bora, J. et al. (2018)**, tried to know the impact of Demonetisation on NSE Index i.e., Nifty 50 and BSE Index i.e., Sensex. **Chauhan, S & Kaushik, N (2017)**, tried to analyse in their research “*Impact of Demonetisation on Stock Market: Event study methodology*”. The analysis showed that the Demonetisation had no substantial impact on the stock market, and that the short-term drop in stock prices could be attributable to some other extraneous variable. **Dash, S.D & Bagha, P. (2017)**, made their efforts to determine the impact of Demonetisation on the stock price movements of top banks in India and to examine the reaction of Sensex, Nifty and Bankex to Demonetisation move in India. The overall performance of banking sector was showing significant at 5% significance level. Therefore, the impact of demonetisation was evidenced to the stock prices of banking sector in India. The demonetisation is a very new concept and occurred for the first time after the economic reforms 1991 and the establishment of NSE. Therefore, it is imperative to evaluate its impact on the Indian Stock Market with special reference to the NSE in respect to the volatility and returns to the investors. There was lot of study in this area but still there was a gap and scope to do further research. This study would contribute to the academia for better understanding the impact on stock market and in facilitating investment decision as Demonetisation is a macro-economic phenomenon and likely event occurs frequently in the economy.

Objective of the Study

The present study attempts:

- To study the performance of selected indices during the pre-and post-demonetisation in India.
- To analyse the impact of demonetisation on volatility of NSE.
- To compare the pre-and post-demonetisation performance of Nifty 50 index.

Hypothesis of the Study

H₀1: $\mu_1 = \mu_2$, "There is no significance difference between the mean returns of Nifty 50 in pre-demonetisation and post-demonetisation period."

H_a1: $\mu_1 \neq \mu_2$, "There is a significance difference between the mean returns of Nifty 50 in pre-demonetisation and post-demonetisation period."

Research Methodology

This study is an empirical analysis of demonetisation and its impact on NSE i.e., Nifty 50 Index for the various time periods.

Sample of the Study: NSE Index i.e., Nifty 50 have been taken as the representative of NSE.

Nature and Data Used for the Study: Daily Closing Prices of Nifty 50 have been considered for the study.

Periods of the Study: Data period is divided into two segments, i.e., pre-demonetisation.

Data Analysis and Interpretation

This study primarily aims to determine and analysis the impact of macroeconomic variable i.e., "Demonetisation on the Indian Stock Market" by comparing and analysis of the

performance and volatility during before and after demonetisation period.

Structure of the Analysis

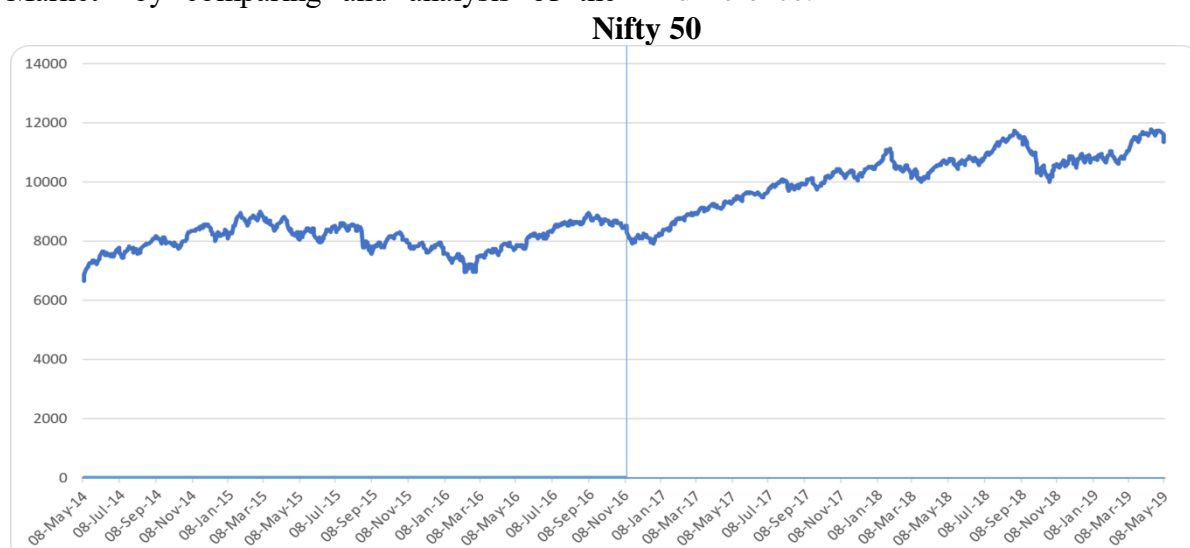
The result of the analysis is presented in five different heads:

- Analysis of Volatility in NSE index for Thirty-months with the help of line Graphs.
- Analysis of CAGR, Mean and Standard Deviation during pre and post Demonetisation return for all the periods under study.
- Analysis of Descriptive Statistics during pre and post Demonetisation period for all the periods under study.
- Testing of Hypothesis to test whether there is any significant difference between the mean returns of the pre and post demonetisation periods.

We shall analysis one by one:

- Analysis of Volatility in NSE index for Thirty-months with the help of line Graphs.**

The objective of this graph analysis to have at a glance performance of the volatility throughout the period under study. These graphs show the overall volatility of Thirty-months, i.e., 08 May 2014 to 08 May 2019 of Nifty 50. This would also cover the other periods under study, i.e., One-months, Three-months, Six-months, and Twelve-months. The closing prices have been considered for the purpose of analysis and one vertical line in the graph on the date 08 Nov 2016 which is bifurcating the pre and post demonetisation period for clear visibility of the difference.



Graph: 1

Graph: 1 shows the overall volatility of Thirty-months of the Nifty 50 with line bifurcating the pre-demonetisation and post demonetisation. It shows the positive trend of the stock market, despite of having high volatility in the post demonetisation as compared to pre-demonetisation. Initially after the announcement, there was little havoc among investors and soon after some time, the information was diluted into the stock prices due to market efficiency and it was recovered soon and become normal after short period. After this effect, the market start growing in the post demonetisation period. The volatility in the pre demonetisation was approximately consistent while in later, it is highly volatile.

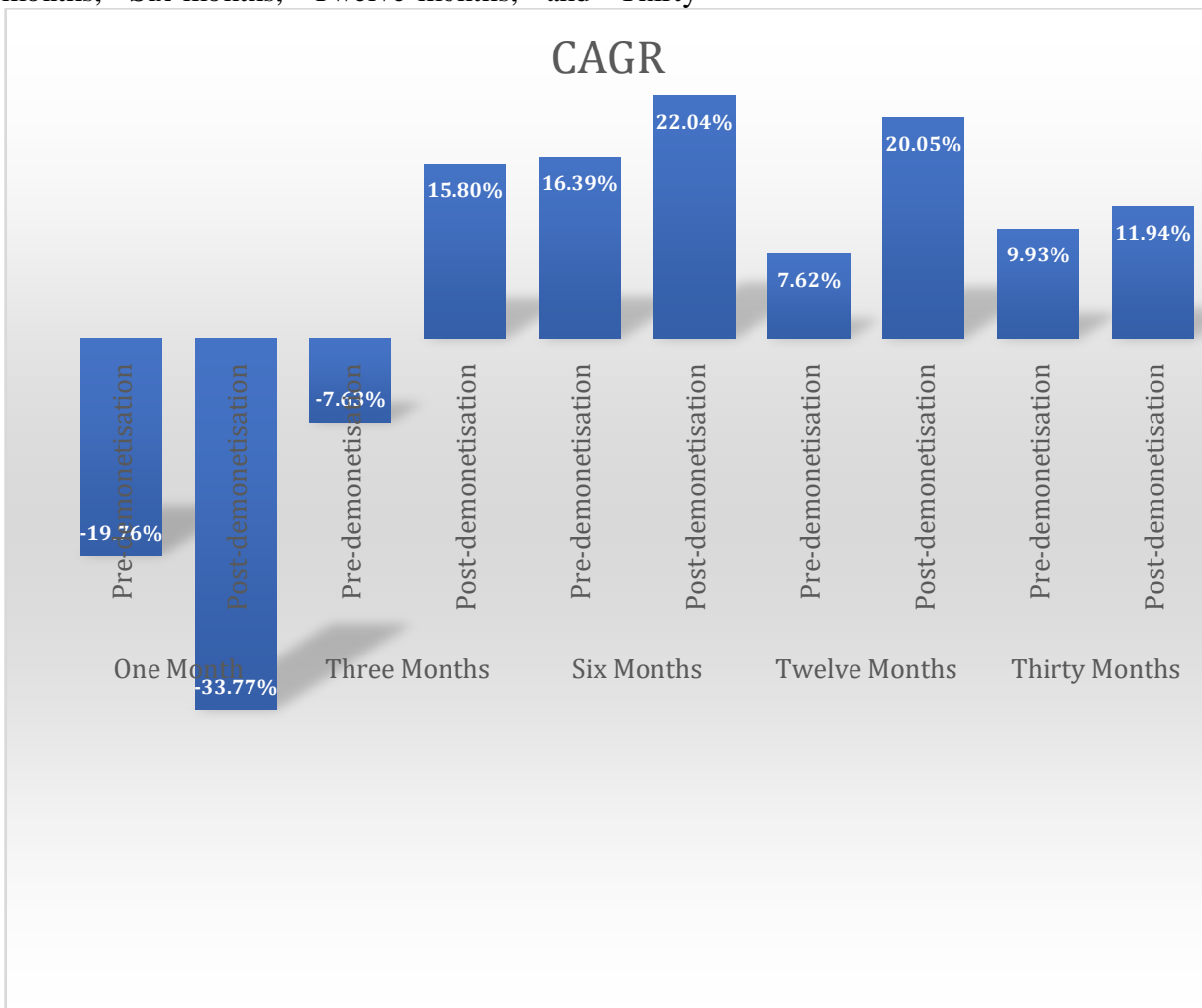
2. Analysis of CAGR and Standard Deviation during Pre and Post Demonetisation return for the period under study

These shows the average annual return and the volatility of all the periods under study i.e., One month, Three-months, Six-months, Twelve-months, and Thirty-

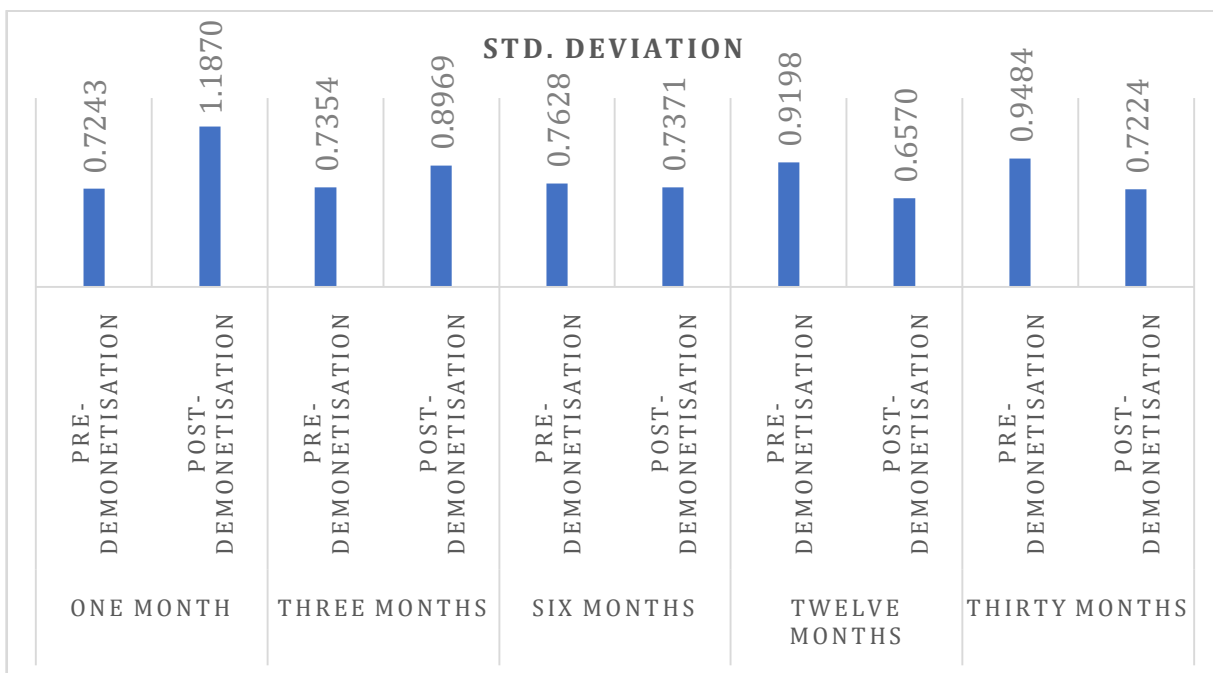
months for the Nifty 50 index and the same is shown by the graphs, which clearly indicates the difference of pre and post demonetisation period. The results have been generated with the use of Microsoft excel, starting with One-month and thereafter for Three-months, Six-months, Twelve-months, and Thirty-months respectively.

Analysis of Nifty 50 for CAGR, Std. Deviation			
Period	Sample	CAGR	Std. Deviation
One Month	Pre-demonetisation	-19.76%	0.7243
	Post-demonetisation	-33.77%	1.1870
Three Months	Pre-demonetisation	-7.63%	0.7354
	Post-demonetisation	15.80%	0.8969
Six Months	Pre-demonetisation	16.39%	0.7628
	Post-demonetisation	22.04%	0.7371
Twelve Months	Pre-demonetisation	7.62%	0.9198
	Post-demonetisation	20.05%	0.6570
Thirty Months	Pre-demonetisation	9.93%	0.9484
	Post-demonetisation	11.94%	0.7224

Table:1



Graph:2



Graph: 3

Interpretation for Table 1, Graph 2 and Graph 3

The closing values of pre-demonetisation and post-demonetisation were analysed for all the periods under study, in respect of CAGR and Volatility indicator i.e., standard deviation for Nifty 50. For the One month, the CAGR of Nifty 50 decreased from -19.76% to -33.77%. The CAGR in post demonetisation period is decreased significantly as compared to pre-demonetisation period, which shows that the Stock Market have given mixed reaction in a very short period. The volatility in the post-demonetisation was higher as compared to the pre-demonetisation period. It shows that the investors and other participants of the stock market was unable to understand the possible impact of the sudden move of the demonetisation and reacted adversely by squaring off their position in the Stock Market. It means that the demonetisation has some impact on the stock market in a short period. For three months analysis, the market absorbed the event as CAGR in post demonetisation period is increased significantly as compared to their CAGR in pre-demonetisation period, which shows that the Stock Market have given positive reaction in three months period. The CAGR of Nifty 50 increased from -7.63% to 15.80%. For Six months, the CAGR of Nifty 50 increased from 16.39% to 22.04%. The CAGR of the various indices in post demonetisation period is

increased significantly as compared to their CAGR in pre-demonetisation period, which shows that the Stock Market have given positive reaction in six months period. The volatility in the post-demonetisation period was higher as compared to the volatility in the pre-demonetisation period. It shows that market movements in both the periods are equal and there is less panic situation in the market and behave normally. For one year, the CAGR in post demonetisation period is increased significantly as compared to their CAGR in pre-demonetisation period, which shows that the Stock Market have given positive reaction in One Year period. The CAGR of Nifty 50 increased from 7.62% to 20.05%. The volatility in both the period is almost equal and given mixed trend except for the Realty Sector which is higher as compared to the volatility in the pre-demonetisation period. It shows that market movements in both the periods are almost equal and there is less panic situation in the market and behave normally. e., standard deviation for all the indices under study. The CAGR of the various indices in post demonetisation period is increased significantly as compared to their CAGR in pre-demonetisation period, which shows that the Stock Market have given positive reaction in thirty months period. The CAGR of Nifty 50 increased from 9.93% to 11.94%.

3. Analysis of Descriptive Statistics during pre and post Demonetisation period for all the periods under study.

This part deals with overall performance of the Nifty index with Mean, Standard Deviation, Skewness and Kurtosis for all the periods under study, i.e., One-month, Three-months,

Six-months, Twelve-months, and Thirty-months during pre and post demonetisation. The basic objective of this analysis is to get overall performance of all the periods, so that these can be compared easily with each other. The results have been explored with the use of SPSS software.

Descriptive Analysis of Nifty 50

Period	Sample	Statistic				Std. Error	
		Mean	Std. Deviation	Skewness	Kurtosis	Skewness	Kurtosis
One Month	Pre-demonetisation	-0.0890971	0.72432325	0.369	1.960	0.501	0.972
	Post-demonetisation	-0.1870009	1.18696747	-0.306	-0.192	0.481	0.935
Three Months	Pre-demonetisation	-0.0234769	0.73538817	-0.004	0.796	0.304	0.599
	Post-demonetisation	0.0456974	0.89694718	-0.434	1.020	0.297	0.586
Six Months	Pre-demonetisation	0.0819785	0.76278558	0.103	0.940	0.216	0.428
	Post-demonetisation	0.0810600	0.73713932	-0.422	1.930	0.217	0.430
Twelve Months	Pre-demonetisation	0.0332661	0.91978259	0.023	1.074	0.155	0.309
	Post-demonetisation	0.0773140	0.65696969	-0.376	1.701	0.154	0.307
Thirty Months	Pre-demonetisation	0.0446362	0.94842016	-0.488	2.836	0.098	0.196
	Post-demonetisation	0.0487894	0.72244329	-0.292	0.933	0.098	0.196

Source: SPSS Output

Table: 2

In Table 2, the mean returns of Nifty 50 and the volatility for one month in the post-demonetisation was significantly higher as compared to the pre-demonetisation period. It means that the demonetisation has created some panic among investors in a very short period and most investors in the markets are risk averse, so responding adversely to the unknown situation or the event to save their investment. Consequently, investors are selling their scrips and volatility is affected. For the three months, the mean returns and the volatility of Nifty 50 in the post-demonetisation period was higher as compared to the pre-demonetisation period. It shows that the investors were able to understand the possible impact of the demonetisation and created speculation in the market, consequently, the volatility in the market is affected. For the six months, the mean returns of Nifty 50 are slightly diminishing and the volatility, in both the period is almost equal and given mixed trend, where volatility is significantly higher in the post-demonetisation period. It shows that market movements in

both the periods are almost equal and there is less panic situation in the market and behave normally. For the one-year period, the mean returns of Nifty 50 have given mixed reaction and the volatility in almost all the sector, in both the period is almost equal and given mixed trends. It shows that market movements in both the periods are normal and there is less panic situation in the market and market is behaving normally. For the thirty months, the mean returns of Nifty 50 in both pre- and post-demonetisation periods are almost same and the volatility, in pre-demonetisation period is higher, as compared to the volatility in the post-demonetisation period. It shows that stocks in pre-demonetisation periods are more volatile and the uncertainty caused due to demonetisation is eliminated in the long term and the market is moving normally. Skewness and Kurtosis are the indicators for checking normality, but we are specifically using Kolmogorov Smirnov and Shapiro Wilk test in our study for data normality for better reliability and qualitative results.

4. Testing of Hypothesis to test whether there is any significant difference between the mean returns of the pre and post demonetisation periods.

The research problem was to analyse whether the mean returns distinguish between the two periods i.e., pre- and post-demonetisation of the selected indices of NSE. For the purpose,

two statistical tests will be used to compare the means of both the periods and to obtain the answer to our research problem:

1. Paired Samples t-Test
 2. Mann-Whitney U Test
- Pair 1: Nifty 50 Pre Demonetisation & Nifty 50 Post Demonetisation

Case Processing Summary and Test of Normality

		Valid Cases		Kolmogrov-smirnov			Shapiro-wilk		
		N	Percent	Statistic	df	Sig.	Statistic	df	Sig.
One Month	Pre-demonetisation	21	100%	0.144	21	0.200	0.949	21	0.332
	Post-demonetisation	23	100%	0.104	23	0.200	0.976	23	0.824
Three Months	Pre-demonetisation	62	100%	0.110	62	0.059	0.966	62	0.086
	Post-demonetisation	65	100%	0.100	65	0.169	0.968	65	0.088
Six Months	Pre-demonetisation	126	100%	0.082	126	0.037	0.981	126	0.070
	Post-demonetisation	125	100%	0.083	125	0.033	0.965	125	0.002
Twelve Months	Pre-demonetisation	246	100%	0.059	246	0.040	0.988	246	0.042
	Post-demonetisation	250	100%	0.069	250	0.006	0.976	250	0.000
Thirty Months	Pre-demonetisation	617	100%	0.061	617	0.000	0.976	617	0.000
	Post-demonetisation	617	100%	0.047	617	0.002	0.989	617	0.000

Source: SPSS Output

Table:3

In the **Table3**, the Pre-demonetisation period and post-demonetisation period for all the periods under study were taken for analysis and there are no missing values in the data, hence the data is considered as reliable. Now, there is a need to check the normality of data for the test to be applied. So, the Kolmogorov Smirnov test and Shapiro Wilk test were conducted to check the data is normal. For one month and three months period, the p-value of Kolmogorov Smirnov test and Shapiro Wilk test for Nifty50 at 5% level of significance, is not significant to reject the null hypothesis, so we do not have sufficient evidence to reject the null hypothesis. The p-value of Nifty 50 is greater than 0.05, for both periods may be

considered as normal and be concluded that the data follow a normal distribution and now, we can conduct the Paired Sample t-test for one month period and three months period. For rest of the periods under study i.e., Six Months, Twelve Months and Thirty Months, the p-value for Nifty50, are lesser than 0.05, which shows that these are significant to reject the null hypothesis, so may be considered as that the data do not follow normal distribution. Now we can conduct the Paired Sample t-test for the periods where the data are found to be normal and Mann Whitney test for the periods where the data is not found to be normal. The results of Paired Sample t-test and Mann Whitney U test are shown in the following tables.

Paired Sample t-test						
Period	Paired Differences	Mean	Std. Deviation	Std. Error Mean	t	Sig (2- tailed)
One Month	Pre-demonetisation - Post Demonetisation	0.0718952820	1.320488982	0.2881543198	0.250	0.806
Three Months	Pre-demonetisation - Post Demonetisation	-0.075529514	1.223334392	0.1553636231	-0.486	0.629

Source: SPSS Output

Table: 4

In the **Table 4**, the data of Nifty50 index for both i.e. One Month and Three Months are found to be normally distributed and are suitable for employing Paired Sample t-test. The results of the Paired Sample t-test is given. At 5% level of significance, the p-value of Paired Sample test for Nifty50 is not significant, which shows

that there is no reason to reject the null hypothesis and we may accept the null hypothesis which says there is no significant difference between the mean returns of the index during pre and post demonetisation period in one-month and three-months period.

Hypothesis Test Summary			
Period	Independent Samples Mann Whitney U Test		
	Null Hypothesis	Sig.	Decision
Six Months	The distributin of Nifty 50 is the same across categories of sample	0.802	Retain the Null Hypothesis
Twelve Months	The distributin of Nifty 50 is the same across categories of sample	0.437	Retain the Null Hypothesis
Thirty Months	The distributin of Nifty 50 is the same across categories of sample	0.972	Retain the Null Hypothesis

Source: SPSS Output

Table 5

In the **Table 5**, the results of Mann Whitney are given, for the period of six months, twelve months, and thirty months. The p-value of the Mann Whitney U test for Nifty50 for the period of six, twelve and thirty months are greater than 0.05 i.e., significance level, so we do not have sufficient evidence to reject the null hypothesis. Hence, it suggests retaining the null hypothesis for Nifty 50, which says that there is no significant difference between the mean returns of the indices during pre and post demonetisation period.

Conclusions

The stock market is seen as a measure for a country's economic health since it contributes such an important role in the development of its economy. Thus, the movement of macroeconomic events such as Demonetisation has a significant impact on the movement of stock market index. The financial markets accommodate and react to any change in macro-economic changes proves to establish a strong relationship between financial markets and economic systems. Therefore, the efforts are made to analyse the impact of the Demonetisation i.e., the historic macro-economic change after the introduction of NSE. The movement of NSE's index i.e., Nifty 50, impacts the investment pattern and decision of a retail investor and hence, a barometer to predict the movement and curb the unnecessary

fluctuations is the need of the day. Data analysis shows that there is no significant impact of Demonetisation on the stock prices during the study. Speculators who buy at a lower price with the intention of selling at a higher price later expected this move to have a significant impact on the market and that the impact would last for a long time, however this study demonstrated that Demonetisation had no effect on the stock market. The impact on the stock market was very transitory since stock indices fluctuated over the week after the announcement of Demonetisation. However, as shown in the study and proved theoretically, Demonetisation has not had the expected impact on the stock market. The findings and the suggestions identified in the study will facilitate both the policy makers and investors to understand and predict the movement of stock market indices which will enhance the return, to frame investment strategies and healthy development of capital market with the favourable policies. Research in the past for likely event has been conducted to know the impact on various aspects but more especially every event is always evaluated the impact on the Indian Stock Market. This fact is only enough to know the significance of Indian Stock Market in the economy. Demonetisation has affected slightly in short-term period i.e., One and Three Months, but it recovered

afterwards. So, this study did not find any significant impact of Demonetisation announcement on stock market prices in the long term. The volatility in the stock market after short period of time would be move towards the normalcy. The investors must also know the importance of macro-economic events and their probable impact on the stock market for their future investment decision making. Thus, this study finds that Demonetisation has had an impact on the Indian stock market in short term. So, investors must constantly update their investing knowledge and information from the market in order to find better investment options with the least amount of risk. The government and the regulators must strengthen the capital market so that, speculators and others may not unnecessarily impact the volatility and thereby, protect the interest of the small investors. They must act to aware all the small investors and spread the financial literacy among the investors, so that capital market attracts more and more investors and channelise their funds towards more productive uses, which ultimately benefits the economy.

Suggestions

Here, in this Study, the efforts are being made to analyse the aftermath impact of Demonetisation on the Indian Stock Market i.e., Nifty 50. The purpose and importance of this study lies for the investors and the other stakeholders of the Indian Capital Market. Demonetisation has been taken as macro-economic change and tried to evaluate the volatility caused after the demonetisation for both short and long term. The impact of macroeconomic variables or events on stock prices is a very relevant and significant subject in today's market environments since these variables are used to enter any given market at any given time. Demonetisation has shown its impact on the Stock Market in the short run significantly to almost all the indices as well as

in the long run for some indices. The retail investors or the institutional investors must be cautious while investing in the stock market when any macroeconomic change happened recently or to be happened in near future. This study will be helpful for all those who is dealing with Stock Market in one way or the other and more importantly to the investors to make the counter strategies to maximise their profits or to minimise loss with minimising the risk. It is evident from this study that the investors in response to any macroeconomic change in the economy, considers as panic situation and not behave rationally. Hence, the investors must not be in panic and should not react adversely as the stock are more volatile during its short run from the event and must always stuck and consider the fundamentals and the company's performance in terms of profitability. Most of the investors are risk averse and respond negatively to any changed economic conditions and hence squaring off their positions to avoid the possible losses or minimising their losses, due to change in macroeconomic conditions. It is suggested that:

- i. The investors must not show any panic after the event i.e., patience is the key to success in the Indian Stock Market.
- ii. There must be a need to closely observe the volatility caused by the speculators in order to build the confidence among the retail investors.
- iii. Investors must rely on the fundamentals of the corporates and be passive in its approach.
- iv. Strengthening and to protect the interest of the small investors and improvising the corporate governance practices.
- v. The concerned authorities must enhance the financial education among the investors and professionalism should be accelerated in the Stock Market.
- vi. SEBI must take measures to make the stock market activity decentralized and competitive.

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A STUDY ON MARKETING OF SELECTED ZERO BUDGET NATURAL FARMING PRODUCTS WITH REFERENCE TO PUNE, SOLAPUR AND AHMEDNAGAR DISTRICTS IN MAHARASHTRA STATE: A LITERATURE REVIEW

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ABSTRACT

A research was undertaken to study marketing of selected Zero Budget Natural Farming products with reference to Pune, Solapur and Ahmednagar Districts in Maharashtra State. Objectives of the study included studying the concept of ZBNF and marketing of ZBNF products, studying the awareness of ZBNF products among buyers and producers, studying the purchase intentions of consumers for selected ZBNF products like vegetables & fruits, studying the features of the existing marketing strategy used by producers of ZBNF, understanding marketing mix used by ZBNF producers, and finding out the problems of ZBNF while implementing the distribution through traditional channels. This article presents the literature review related to the topic.

Keywords: ZBNF products; Literature review; Marketing strategy; Awareness

Introduction

The word zero budget means no expenses or no credit, without any credit & without spending any money on purchased agricultural inputs. Another term natural farming is a technique of chemical-free agriculture drawing from traditional Indian practices. In other sense, natural farming shows the significance of the synergistic impact of both plant & animal products on crop establishment, to form soil fertility and microorganisms. Natural farming is working with nature produced great food, & keeping healthy over selves, it is also called as do-nothing farming on the grounds that the farmer is considered as a facilitator & the real work can be done by nature. No tillage, no pesticides, no chemical fertilizer in this farming. First time in Japan, M. Fukuoka started work on natural farming, and his outcomes showed that yields from natural farming are similar to chemical farming however without soil erosion also maintains soil fertility for a longer period. There are no external inputs to his experiments and he utilized locally accessible on farm products are utilized. That's why he got negligible or zero cost of cultivation. His outcomes compiled in a book one straw revolution. Natural farming reduces the external inputs to farmland which degenerate the soil nature, rises microbial population, better soil aeration & good water retention capacity. Controlling of cabbage

moth and cabbage worm first time he extricated natural insecticide like pyrethrum from chrysanthemum roots and utilized in his experiment got success on it.

Padma Shri recipient Mr. Subhash Palekar first time adapted this zero budget natural farming (ZBNF) system in the Indian 1990s which is an alternate to the Green Revolution. He was agriculturist belongs to Maharashtra finished his bachelor's degree in agriculture. He contended that the rising cost of these external inputs in farmland was a main cause of indebtedness & suicide amongst farmers in India, and the effect of chemicals & pesticides burning of residues are on the environment & long-term fertility was destroying.

A research was undertaken to study marketing of selected Zero Budget Natural Farming products with reference to Pune, Solapur & Ahmednagar Districts in Maharashtra State. This article presents the literature review related to the topic.

Objectives of Literature Review

The review was carried with the objectives of covering the following literature:

- a) Concept of ZBNF,
- b) Marketing strategy related to ZBNF products,
- c) Marketing mix related to ZBNF products,
- d) Distribution and other issues related to ZBNF products.

Review of Literature

1) Harini et al. (2021) conducted a research in Vizianagaram district of Andhra Pradesh. In Vizianagaram district, the major crops grown under Zero Budget Natural Farming (ZBNF) were Paddy, Cotton, Maize, Green gram, Black gram, Bendi, Brinjal, Mango & other crops were grown under small proportions. The majority of the ZBNF practices were applicable to more than one crop with multiple usages of aśtras & kashayams for prevention & control of several pests & diseases in different crops. More than three fifth of the ZBNF farmers (65 per cent) have adopted kitchen garden model in their back yard. Majority (85 per cent) of the ZBNF farmers followed maize, paddy and pulse cropping pattern followed by maize, paddy and vegetables cropping system as expressed by 75 per cent farmers.

2) Naik et al. (2021) stated that agriculture is considered the backbone of Indian economy since centuries. Originally India had subsistence type of farming but as the dependence on food grains expanded with increasing populace it had automatically moved to commercial farming. The present form of agriculture is over burdened with inorganic chemicals, pesticides & fertilizers. Hence when a farmer with a small farmland invests on expensive inputs, he is presented to high monetary risk & gets caught eventually into the debt cycle. With such diverse negative effects of commercial farming it has become highly essential to adopt other ways which can prompt better results with negligible effect on natural resources. Anyway, here comes the question that, what are the ways in which low-input farming can be practiced to accomplish good production outputs? The answer for this question is 'Zero Budget Natural Farming' (ZBNF). The idea was first developed in Maharashtra by Subash Palekar. ZBNF, as the name specifies, where the cost of growing & harvesting is zero. It implies that farmers have no need to buy fertilizers & pesticides in order to ensure the healthy growth of the crops & furthermore this system of farming improves the nutritional value & crop production thus contributing to the food security in the country.

3) Koner et al. (2021) in their paper envisages the economic viability of 2

alternative models of organic farming i.e. Scientific Organic Farming & Zero Budget Natural Farming (ZBNF). In the empirical survey the study considers 2 clusters based on the 2 alternative organic models (i.e. a scientific organic farming model in Burdwan district & a ZBNF model in Purulia district) in West Bengal, India. Performance of these models is assessed by considering 3 important parameters i.e. cost of cultivation, yield & income. Evidences uncover that the organic farmers under both models have encountered a reduction in per hectare production cost & yield for their crops in the post-conversion period. Evidences likewise recommend that farmers adopting ZBNF model in Purulia were able to upgrade their income, whereas the income decreased significantly for the farmers practicing scientific organic farming in Burdwan. Furthermore, a comparative in-depth analysis of performance is carried out between these 2 alternative models in order to recognize the factors that can impact their long-term sustainability. Results demonstrate that long term sustainability of the organic model is conditioned upon the interchange of agro-climatic conditions & various other socio-economic factors.

4) Veluguri et al. (2021) studied that input-driven agriculture has led to an epidemic of impoverishment, farmer suicides, & environmental degradation in India, yet has additionally shown consistent staying power in Indian politics. The researchers examine the case of organic farming policy adoption to investigate this paradox. In particular, their objective was to assess how the state-wide Zero Budget Natural Farming (ZBNF) program (now officially known as Community Managed Natural Farming) in Andhra Pradesh, India came to be. Proof was drawn from government documents, in-depth interviews with stakeholders, field notes from a ZBNF workshop & farmer interactions. Results recommend that advocacy of civil society networks, emphasis on rural livelihoods, champions within the bureaucracy, and the twenty year history of consensus building around agroecology all played a main role in the adoption of the ZBNF program in this state. Given the chance of scaling up ZBNF at the

national level, their analysis of the enabling environment is particularly timely.

5) Pazhanisamy (2021) explained that the importance of eating nutritious & chemical-free foods is progressively expanding. Consumers are willing to pay more for high-quality produce. To accomplish economic empowerment, farmers should seize this entrepreneurial potential. In this context, one such attempt by a farmers' interest group was inspected. In the paper, the formation as well as behavior of the group, along with the group dynamics of the group members, were examined and discussed. Using the case study process, first-hand information was collected through a well-planned interview program, in-depth interviews with community participants, & the researcher's crucial discoveries. The Group Dynamics Index (GDI) was created to evaluate the dynamics of a group of people. This paper aims to uncover a better agricultural method for poor & marginal land owners in order to increase their benefits. Farmers are being motivated to invest less & develop more under the zero-budget natural farming scheme. Dashparniark&Jivamrut, which are made from cow dung & urine, are utilized by farmers. This has resulted in improved soil beneficial macro & micro flora and fauna, as well as a 40 to 45 % reduction in agricultural costs. Farmers make a lot of cash as they go to the shop to sell their products. This has revived the conventional mixed-cropping method & reduced farmers' dependence on the demand for seeds & inputs.

6) Walker et al. (2021) in their paper presents the utilization of thematic collages as a methodological innovation to participatory photography as a research framework. Participatory photography was utilized to understand the subjective "off-script" motivations behind the partial or full adoption of ZBNF (Zero Budget Natural Farming) by members of women's self-help groups in Andhra Pradesh, India. The adding of thematic collages to existing participatory photography methods was created as a mechanism to better support the dialogic generation of new Freirean "generative themes" for examination by a group. Further, the utilization of thematic collages invites the assimilation of "renegade" or non-thematic images into participant group

analysis. Zero Budget Natural Farming (ZBNF) is an agricultural practice that has become an extension priority in Andhra Pradesh, India. It emphasizes the utilization of defined chemical-free inputs & regenerative farming methods as a holistic approach toward socio-ecological resilience. As a portion of an interdisciplinary research project, this participatory photography design was guided corresponding to a soil science experiment in 3 geographically distinct agroecological zones in Andhra Pradesh. The researchers show how participatory photography, with the novel addition of thematic collages, can be assimilated into interdisciplinary research as a method to find the underlying motivations to embrace agricultural practices & participate in agricultural movements like Zero Budget Natural Farming (ZBNF).

7) Ranjan et al. (2021) stated that agriculture is an important as well as indispensable sector in India for the sustenance and development of the Indian economy. Farmers are relied upon inorganic or external chemical inputs like pesticides & fertilizers which lead to contamination of groundwater as well as other water related ecosystems. It additionally leads to reduction in soil fertility over time. Overuse of fertilizers, pesticides or other chemical inputs is a serious issue for the health of farmers across India. In order to guaranteeing food security by reviving Indian agriculture in environmentally safe manner and to release farmers from debt cycle, ZBNF (zero budget natural farming) can be a viable solution. It discards utilization of all the chemical inputs & depends on natural way. Zero budget natural farming has mainly 4 pillars that are 'Bijamrita', 'Jivamrita', 'Acchadana' (mulching) & 'Whapasa'. It implies no money is spent to purchase inputs such as pesticides & fertilizers. Zero budget farming promises to exorbitantly lessen production costs. Zero budget farmers depend on soil conservation techniques, mulching, natural pesticides & fertilizers. Due to continuous retention of crop, residues renewal of the soil fertility & it helps in maintaining the soil health. Management of pest & diseases is a critical segment in zero budget natural farming crop production systems. In ZBNF (zero budget natural farming), formulae for

fungicides i.e. sour buttermilk (khatti lassi), 'Sonthastra' for pest management i.e. 'Brahmastra', 'Agniastra', 'Neemastra', 'Dashparni ark'. ZBNF permits farmer to develop chemical free as well as healthy & safe food.

8) Kumar et al. (2021) stated that the world today is finding ways & means to have an agriculture production system which doesn't depend on synthetic chemical fertilizers & chemicals, yet on a system which is based on the utilization of natural products, doesn't make our natural resources viz. the water, the land and the air toxic. This production system has additionally to be eco-friendly, sustainable, remunerative & should not compromise with the future generations. Organic farming, Zero budget Natural Farming (ZBNF) of Subhash Palekar & utilization of Compost & Vermicompost are thus now preached & practiced all around the world to produce safe & healthy food & to invert the damage done to the precious natural resources. The present endeavor is an investigation of the use of vermicompost in bringing sustainability & benefit the cold arid Ladakh region.

9) Mohanapure et al. (2020) examined that the 'Green Revolution' due to conventional farming prevailed due to adoption of improved varieties of seeds, chemical & synthetic fertilizers, pesticides & farm machineries incorporation. Attributable to this it leads a serious concern related to human health & soil texture & fertility. Accordingly, there's a need to move towards the sustainable farming which is environmentally acceptable & economically viable. This article edifies chaos caused in agriculture & health due to current conventional farming and its adverse impacts. It gives the present fact, scenario, & solutions, an alternate to completely destroy rising crises in Indian agriculture. Investigating an alternative solution, Zero Budget Natural Farming (ZBNF) is found the only way to manage this issue in the integrated & sustainability of natural resources. The method of Zero Budget Natural Farming (ZBNF) in present-day agriculture enlightened several concepts, ideas, & processes to be effectively used for the long term sustainability of Indian farming. ZBNF's system of approach is basically based on the natural ecosystem which

incorporates compost and green manure, seed rotation, biological pest control, & mechanical cultivation. The 4 wheels of ZBNF's are most common & cost-effective namely Acchadana, Jivamrita, Bijamrita, and Whapasa. The significance & practicability of ZBNF is though time memorable but their advantages are never-ending. Thus efforts are made to describe the ZBNF system, sustainability & utility for Indian farming practices.

10) Korav et al. (2020) studied that 60 % of the Indian populace will experience severe food deficiencies by 2050. Increased food production is earnestly required, however the high cost of production, and fluctuating prices in the market are driving farmers into debt. ZBNF (zero budget natural farming) is the best solution to decrease the input cost of farmers. The word zero budget signifies "no credit" & natural farming signifies "growing of crops without chemicals". First time in the world, Japanese agriculturist M. Fukuoka created natural farming & a similar trend was made in India by Mr. Subhash Palekar, he began the ZBNF concept & made successful in south India. 523,000 farmers have effectively changed over to ZBNF in Andhra Pradesh and one lakh farming houses in Karnataka. This concept works on 4 concepts they are jeevamrith, mulching, bijamrith, & soil aeration. These 4 concepts assist with better soil health, expanded microbial population, & upgraded crop yield. Different astras used to control pest infestation in natural farming. Here the researchers discussed that ZBNF requires low input cost, good soil health management, & focused on major opportunities & challenges to embrace ZBNF & what are the policies need to improve this system.

11) Tarale et al. (2020) specified that farmers in India don't get a fair price for their yield. The deal is via middle agents which does not help farmers in making a good profit. Furthermore, farmers are opting farming practices that incur high input costs to them by utilizing chemical pesticides. The aim of this research paper is to build an android application for recognition of agriculture produce utilizing Deep Learning to give a platform for farmers to sell & give them a decent amount for their produce. At the consumer end, the consumers are guaranteed

100 per cent fresh produce that is chemical-free by embracing Zero Budget Natural Farming (ZBNF). This project will be carried out in the buying–selling platform for agricultural products. The application will be enhanced to show the price of the product when the farmer projects his phone camera onto his produce. He can acknowledge the deal if he is getting a decent amount for the produce & thus totally remove the involvement of middle agents. In general stores, the cashier manually enters the code or scans the barcode attached to the product to print the bill. Sometimes, the fruits and vegetables might not have barcodes. By utilizing this application, items can be recognized based on their appearance alone. Rather than entering the code or scanning the barcode manually, the phone camera is projected onto the product; the application then identifies the product. It works even if they are in front for a short period & are not absolutely still.

12) Sain et al. (2020) studied that ancient farming methods with yogic techniques are reported as the zero budget sustainable method for seed germination, cultivation, plant growth, & harvesting. It raises the crop yield resulting in enhanced production & improved soil fertility. The Brahma Kumaris' Raja Yoga Meditation (BKRYM) technique rejuvenated by Raja Yoga Education & Research Foundation (headquartered at Mount Abu, Rajasthan, India) is scientifically proven not only for an enriched quality of farm produce but also for the welfare of farmers who practice this meditation. A drive was taken in the Indian Finance Budget (July 2019) to propose & present Zero Budget Natural Farming (ZBNF), which promotes sustainable yogic agriculture. Indian Council of Agricultural Research (ICAR), Scientific Research of India, and Union Agricultural Ministry are additionally promoting this concept of yogic farming, however the farmers & researchers are not much aware of this holistic concept, which should be acknowledged & adapted to the particular social-cultural settings. BKRYM based yogic agriculture is a unique technique of farming which assists in the sustainable development of the agro-ecosystem. This paper is aimed to investigate the various studies, which shows that yogic-farming technique

(BKRYM + Organic farming) is much effective & superior to standard organic farming & chemical-based farming in terms of improving seed germination, plant growth, nutritional values, soil health, profitability along with farmers' well-being & lessening plant diseases, fungal & slug attacks & germination time.

13) Münster (2020) stated that the emergence of alternative agricultures creates a circumstance of agronomical pluralism, in which farmers need to choose between radically different & incommensurable styles of farming. The chapter focuses on how Subhash Palekar, the inventor & leader of Zero Budget Natural Farming involves with the scientific mainstream in agricultural research. The researcher argues that alternative agriculture in India react to a crisis among small-scale farmers for which they partly blame the particular scientific of agriculture in the wake of the green revolution. Natural farmers evaluate agronomical sciences for their dependence on chemistry at the expense of microbial understanding & for their absence of appreciation of traditional agricultural practices. Natural Farming's engagement with Green Revolution science is projected in nationalist terms of Indian tradition opposing the onslaught of Western imperialist science.

14) Smith et al. (2020) analysed that under current trends, sixty per cent of India's population (>10 per cent of people on Earth) will experience severe food deficiencies by 2050. Expanded production is desperately needed, but volatile prices & high costs are driving farmers into debt. Zero budget natural farming is a grassroots movement that intends to improve farm viability by decreasing costs. In Andhra Pradesh alone, 523,000 farmers have converted 13 per cent of productive agricultural area to Zero budget natural farming (ZBNF). In any case, sustainability of ZBNF is questioned because external nutrient inputs are restricted, which could cause a crash in food production. Here, the researchers showed that ZBNF is likely to lessen soil degradation & could give yield advantages for low-input farmers. Nitrogen fixation, either by free-living nitrogen fixers in soil or symbiotic nitrogen fixers in legumes, is probably going to give the

significant part of nitrogen available to crops. Be that as it may, even with maximum potential nitrogen fixation and release, only 52–80 per cent of the national average nitrogen applied as fertilizer is expected to be supplied. Consequently, in higher-input systems, yield penalties are possible. Since biological fixation from the atmosphere is conceivable only with nitrogen, ZBNF could restrict the supply of other nutrients. Further examination is required in higher-input systems to ensure that mass conversion to zero budget natural farming (ZBNF) doesn't limit India's capacity to feed itself.

15) Ankush et al. (2020) stated that agriculture is an important sector in India. It is imperative for the sustenance and growth of the Indian economy. A large portion of the farmers vigorously rely upon inorganic external chemical inputs such as fertilizers & pesticides that defile groundwater & other water-dependent ecosystems, lessen soil fertility over time. The continuous utilization of pesticides & chemicals is a major issue for the health of farmers across India. Central government's guarantee to double farmer's income by 2022, with the similar one aspect being considered is natural farming methods such as the ZBNF (Zero Budget Natural Farming) given by Shri Subhash Palekar, for which he was honored with Padma Shri. 'Zero budget' signifies without utilizing any credit, and without spending any money on purchased inputs such as pesticides & fertilizers. Zero budget farming promises to drastically reduce production costs. Zero budget farmers use soil protection techniques, mulching, natural pesticides & fertilizers. The principal methods of Zero budget natural farming has basically 4 pillars Bijamrita, Jivamrita, Acchadana (Mulching) and Whapasa. Palekar additionally gave formulae for Fungicides, for example, Sour buttermilk (Khatti Lassi), Sonthastra for pest management i.e. Brahmastra, Agniastra, Neemastra, Dashparni ark. Saptdhanyankur ark additionally been utilized for shining in fruits, vegetables and seeds. By utilizing ZBNF, farmer will be able to develop chemical free food.

16) Naik et al. (2020) in their research work mainly focused on comparative economic analysis of Zero Budget Natural Farming for

Kharif Groundnut under Central Dry Zone of Karnataka. The reason of conducting the study is to analyse the cost of cultivation for Zero Budget Natural Farming (ZBNF) with other treatments. This is mainly because farmers are confronting high cost of cultivation by practicing conventional farming as it is highly relies upon external inputs. ZBNF is low cost technology where, farming is practiced by utilizing beejamrutha, jeevamrutha, mulching & whapsaetc. The Groundnut experiment was led at ZAHRS, Babbur Farm, Hiriyur during Kharif 2019-2020 in order to estimate economics for various treatments. Every treatment was having different input usage. For calculating economics of every treatment, conventional cost of cultivation method was followed (i.e. calculation of Fixed cost, Variable cost, Gross returns, Net returns and B: C). The outcomes of economic analysis revealed that the per hectare yield (17.46 q/ha) total cost (53,019), gross returns (88,871), net returns (35,852) & B: C (1.68) were observed to be highest in RPP among all treatments i.e. OPS, ZBNF, and Control. The cost of cultivation of ZBNF 22.55 % is lesser than RPP. The B: C ratio was observed to be more in ZBNF (1.66) than OPS (1.58). This is because of highest cost for purchase of extra quantity of FYM in case of OPS. It is concluded from the study that RPP was best treatment amongst all treatments. This is because of highest yield, net returns & B: C was found in RPP treatment when contrasted with all treatments. In the economic point of view, there was decrease in total cost in case of ZBNF with fewer yields when contrasted with RPP.

17) Meek et al. (2020) studied that rate of farmer suicides are skyrocketing among agrarian societies. The researchers analyze the role of Zero-Budget Natural Farming (ZBNF) as a form of grassroots intercession in this crisis. Leaders of an Indian agrarian social movement known as the Karnataka Rajya Raitha Sangha contend that educating farmers about Zero-Budget Natural Farming has the potential to improve financial autonomy, mitigate the farmer suicide issue, & eventually contribute to food sovereignty. Synthesizing insights from the political ecologies of health & education, their analysis recommends that

farmers' livelihoods are stronger after their change to ZBNF, & that their wellbeing is improved.

18) Kharwal et al. (2020) stated that a field experiment was conducted in Randomized Block Design (RBD) during Kharif season 2018-2019 to assess the impact of inorganic, organic & Zero Budget Natural Farming (ZBNF) on 15 selected genotypes of adzuki bean for growth parameters. Huge differences in the plant height, pods per plant, number of branches, seeds per pod and seed yield were acquired in genotypes as well as various production systems (organic, inorganic, and zero budget natural farming), whereas no significant difference were acquired in pod length. Simultaneously interaction impact was significant for plant height & seed yield whereas, there were no significant interaction acquired for number of branches per plant, seeds per pod, number of pods, and pod length. The overall finding of this investigation indicated that Zero Budget Natural Farming (ZBNF) production system can be utilized to accomplish better growth & yield of adzuki bean.

19) Kumar et al. (2020) stated that Natural Farming or Zero Budget Natural Farming (ZBNF) has become a turn point of conversation among the government, agricultural scientists, farmers & several other informal groups engaged in agriculture. This is predominantly because of the explanation that there are 2 diametrically opposite school of thoughts on this topic co-existing in the nation. There are scientists who straightaway dispose of the philosophy of Natural Farming. Conversely, its proponents are claiming the method to be panacea for all issues causing distress in Indian agriculture, particularly for smallholders. In order to get the solution for several critical questions, NITI Aayog entrusted the teams at ICAR-CRIDA & ICAR-NAARM to carry out the present examination. The study required both primary survey as well as lab analysis of samples. The primary survey, which incorporated various information related to socio-economic profile, input use, cropping pattern, output marketing, etc. from the Natural Farming adopters as well as Non-adopters was led by NAARM-team. Simultaneously, plant & soil samples from selected fields of adopter &

non-adopter farmers were additionally collected for lab analysis, which was done by the team at CRIDA.

20) Biswas (2020) stated that crisis of Indian agriculture is extremely pertinent at this moment as green revolution is progressively losing its hope. Excessive, trivial exploitation of broods of green revolution has left bad footprints on nation's food security & environmental safety. With the motto to ensure food security by restoring Indian agriculture in ecologically safe way as well as to release farmers from suicides & debt cycle, ZBNF (zero budget natural farming) has come in the picture, which disposes uses of all the chemical farming inputs and depends on natural way of farming viz. rejuvenating soil & crop health through its own practices (jivamrita, mulching, bijamrita, intercropping, bunds, soil aeration, crop diversification, bio-pesticides etc.). ZBNF movement right now is the most famous agrarian movement which started in 2002 in Karnataka & later effectively spread in many states (specially, of South India) of the country through numbers of trainings, demonstrations and different promotional activities. Effective results from farmers' fields of south Indian states like Karnataka, Andhra Pradesh etc. are encouraging & grabbing attention of farmers, private & public organizations towards ZBNF in recent times. However, different controversies regarding its transparency, efficacy, inadequate information, idealisms, practices, even the term 'zero budget' etc. have agglutinated around ZBNF over the years since it debuted. Critics indeed have cited several references of drastic yield reductions with ZBNF (zero budget natural farming) practices in many places. Adequate scientific evaluation or monitoring of ZBNF's failures or successes through multi-locational trials is now therefore the needful, prior to restraining or permitting its run in Indian agriculture.

Conclusion and Research gap

Most of the research on ZBNF is tilted towards technicalities of ZBNF. A study through a marketing perspective employing the classic dimensions like marketing strategy, and marketing mix is not seen. The literature advocates use of ZBNF but fails to answer basic marketing questions like what kind of

buying behavior is seen in case of ZBNF products? This study addresses marketing related questions pertaining to ZBNF vegetables and fruits. Specifically the research questions that are addressed are:

RQ1 – What is ZBNF and how are ZBNF products marketed?

RQ2 – What is the awareness level about ZBNF products among buyers and producers?

RQ3 – What type of purchase intentions are seen for ZBNF products?

RQ4 – What are the features of the existing marketing strategy used by producers of ZBNF?

RQ5 – What type of marketing mix is current used for ZBNF products?

RQ6 – What are the problems while implementing the distribution through traditional channels?

The study endeavors to offer a comprehensive marketing perspective by studying various dimensions like product awareness, buying behavior, marketing strategy, marketing mix and distribution channels.

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INTENSIFY LARA TRANSFORMATION AND BES-AOMDV OPTIMIZED MULTI-PATH ROUTING PROTOCOL FOR WIRELESS NETWORKS

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ABSTRACT

Congestion is one of the significant difficulties looked at in Wn's. Blockage in WN brings about parcel misfortune expanded energy utilization just as expanded deferral. This paper is zeroing in on the ways to deal with control blockage in Wn's. Because of the absence of incorporated control in Adhoc-based remote organizations, planning a steering convention to give a proficient and appropriate technique to course the information with less clog, bundle drop has turned into a difficult issue in remote organizations. The significant goal of the present review is to foster a Load Aware Congestion Control. The further developed rendition of directing conventions is proposed Fuzzy Enhanced Load Aware Routing in Ad hoc (FE-LARA). Here, WNs climate is recreated in MATLAB for different situations to figure LARA and FE-LARA. Outcomes got from this extensive investigation discover that FE-LARA offers a strong improvement in opposition to winning methodology with LARA The improved variant of directing conventions are proposed in this paper Bald Eagle Search (BES) calculation directed specially appointed on-request multi-way distance-vector convention (AOMDV). Reproduction aftereffects of the proposed convention show the presentation upgrades as far as the control overhead, bundle conveyance proportion, normal postponement, and parcel drop proportion in correlation with traditional AOMDV and AODV steering.

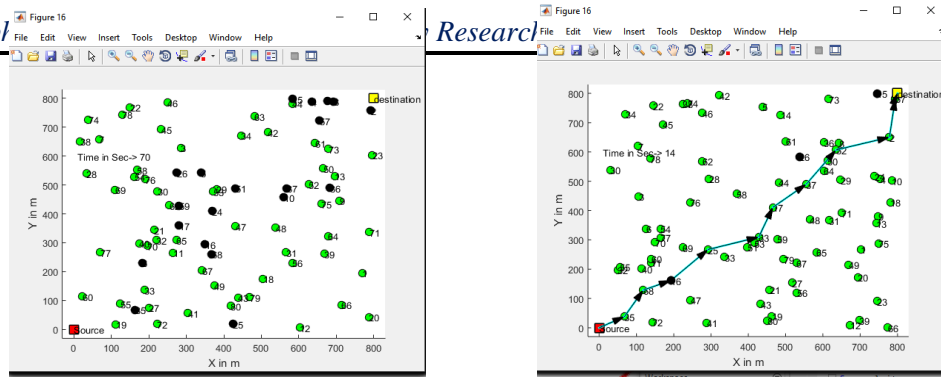
Keywords: BES-AOMDV, AODV, AOMDV, LARA, FE-LARA

1. Introduction

An enormous scope, the clogged organization is described by extensive medium inhabitance, high throughput, frequent bit blunders, various retransmissions, and significant information rate varieties. The event of a high thickness of hubs inside a solitary crash domain of an IEEE 802.11 organization, as in metropolitan settings, can result in blockage, in this manner causing a Significant performance bottleneck. Effects of blockage include drastic drops in network throughput, unacceptable packet delay, meeting interruption, and broad use of the channel by egotistical hubs. A viable congestion control instrument guarantees the organization robust operation and performance. When the blockage is recognized by a hub, called a bottleneck, sources ought to be advised to adapt their transmission rate. The source may be dynamic a few bounces away where it is out of the transmission range of the bottleneck.

Definitive goals of WN distinguish with development with portable targets checking circumstances such as moistness, temperature,

and dampness of the climate. WNs hubs are by and large having innate requirements like the availability of energy supply alongside correspondence or computational capacity. Suggested multipath directing for homogeneous WNs. The motivation behind suggesting directing technique which decreases utilization of energy then equilibrium weight brings about further developed organization lifetime. Likewise, we plan to diminish the bundle misfortune rate. The proposed steering technique incorporates 3 stages: grouping network hubs, finding the ways among CHs, and keeping up with the ways. This examination has proceeded with solid demonstrating and investigation for contributing and to secure huge upgrades: Initially, an original and upgraded followed refreshing system-dependent with dynamism levels of networking technique expected further develop for the lifetime of the network. At last, reproduction has been finished with MATLAB re-enactment climate for figuring measurements.



a)

b)

Fig. 1 Link Establishment

II Related works

In [1], a blockage is distinguished by estimating the queue length. Blockage constrained with utilizing three techniques I) bounce by-jump stream be in charge of, ii) source rate-limiting, finally iii) focused on layer MAC. Indeed, a high offered load professes accomplishment with greater

throughput and decency. In[2], a clog organize procedure in which bundle service time is utilized for gathering accessible assistance rate and therefore detects blockage in each moderate sensor hub. The congestion is constrained by bounce by-jump method and it uses rate change dependent on the accessible assistance rate and number of youngster hubs

Protocol	Route Selection Criteria	Extensi on of	Categ ory	Single path/ Multi-Path	Advantages	Limitation
D-LAOR	Packet buffered in queue and hop count	AODV	Delay Based	Multipath	Increases packet delivery fraction and Decreases end to-end delay in a moderate Network scenario in comparison to AODV and other LAOR protocols.	Routing overhead is comparatively high
WLAR	Total traffic load	AODV	Delay Based	Multipath	Avoids the influence of burst traffic	Overhead of route request packets
CLAR	traffic load of node and neighboring nodes	AODV	Traffic Based	Multipath	Better suited for the heady load networks with low mobility.	Note suited for mobility environment
PALB	Predicting the Cross-traffic of each node in the multiple disjoint paths	AODV	Traffic Based	Multipath	PALB mechanism is effective; end-to-end delay are decreased and energy consumption is balanced by applying PALB with multipath routing together	Specific pattern is required to predict the network traffic

In multipath coordinating cooperation, different ways are set up from source to destination target centers traffic which is parcelled with multiple ways. Essential advantages of multiple way coordinating have high constancy ways with extended capability with correspondence joins information transmission. The certain new investigation considers on making successful multipath guiding systems are analyzed in the going with. Moridi et al. [1] present the FTCM computation of WNs. The arrangement creates creamer energy-capable flowed gathering with set up in the computation. CH center can find insufficient centers gathering and using various testing and separate larger part projecting voting form. Moreover, a support center point was picked in the individual gathering. Which is dependent on saving data copies, screen and introduce CH, further foster variation to the interior disappointment of gathering head center point. Three different ways were found from source CH to BS. The courses picked reliant on limits: waiting energy, no. of ricochets, expansion rapidity & steadfast quality.

Cai et al. [2] tended to versatile energy-capable multipath coordinating for WNsBee- - C; system further evolved interpretation of Bee-

Believe it or not, Bee- - C inquiry-driven multipath controlling, made of essential stages: melding bundles, creating diverse ways, and sending data. In the chief stage, an exceptional grouping system has been tended to. In this manner, bundle erection is outlined. Resulting stage, phony bumble bee state estimation develop various ways among CHs and the sink Manjeshwar et al. [3] recommended guiding procedure standardized WNs; limit sensitive energy capable association show. Strategy responsive coordinating show. In this strategy, on happening a change of a gathering, the CH ought to impart the hard and sensitive limit regards to its pack people. Centre points sense their present situation consistently and convey their data to the CH as shown by the edge regards.

III System Model

In our framework model, position-mindful homogeneous versatile hubs are thought of. Several organization hubs () are conveyed haphazardly on a 2D organization climate. On the off chance that the portable hub is situated inside its correspondence range, it can speak with some other hub. Figure 1 exhibits the framework plan for the proposed convention.

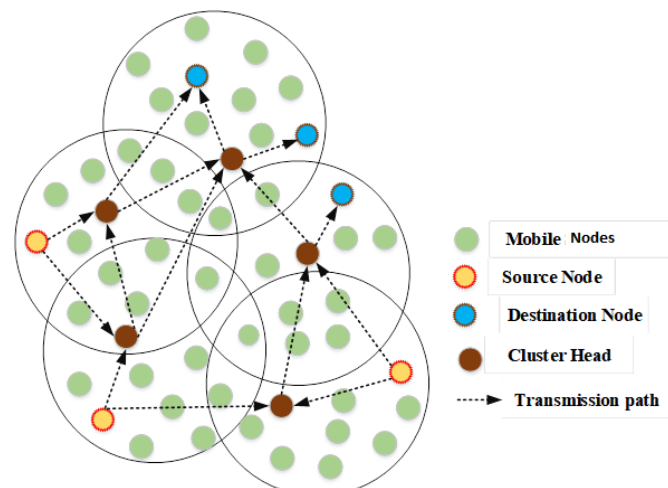


Figure 2: System model for the proposed protocol

III fuzzy based load aware routing

The assessment, unique dynamism efficiency-based weight changing measure will be normally redesigned overall reviving method and chipped away at neighborhood heuristic arrangement. This work offers a valuable energy-powerful controlling methodology for

WNs to discard explicit objectives in winning models.

Energy Model

Distance between from source to destination with data various size of packets will be a measure aimed at for each node for energy consumption. Total energy utilization for

transmission of data will be calculated using equation (1) [5].

$$E_{rx}(b, D) = \begin{cases} bE_e + b\varepsilon_{fs} D^2 & \text{if } D < D_0 \\ bE_e + b\varepsilon_{mp} D^4 & \text{if } D \geq D_0 \end{cases} \quad (1)$$

Distance D_0 for high communication with each node is estimated by equation (2)

$$D_0 = \sqrt{\frac{\varepsilon_{fs}}{\varepsilon_{mp}}} \quad (2)$$

The energy utilized (E_{rx}) amount of b bits acknowledged with receiver node, is estimated by equation (3)

$$E_{rx}(b) = bE_e \quad (3)$$

Cluster Formation

In the cluster formation phase, the mobile nodes will be amalgamated information of clusters Dynamic K-means technique merges with data from "K" clusters. Computation can be done using Equ (2) for the K value. Network region partitioned as "K" no. of clusters having high intra-cluster and less inter-cluster.

$$K_c = \sqrt{\frac{n}{2\pi}} \cdot \frac{S}{ON_D^2} \quad (4)$$

Coming up next are a couple of suppositions considered in the proposed framework plan,

- In the field, there is not difficult to reach the network hub.
- Inside the organization, all hubs are moved uniquely.
- A fixed correspondence reach and energy is dispensed for every versatile hub.

The BES estimation is fused into a customary example multipath coordinating show called AOMDV for ideal way assurance. The Bald-Eagle Search computation is a nature breathed new live into progress estimation that copied the hunting thought of bald eagles. Assurance, Searching, and Swooping are the three periods of movement associated with the hunting procedure of bald eagles. As expected, the estimation can be separated into three stages, for instance, Initialization, Construction stage, and Transmission stage. Initialization Stage The determination stage incorporates the ID and choice of best region, in the chose region the bird can chase for prey. The accompanying condition is used to address the numerically.

$$P_{new}, k = P_{best} + \alpha * r(P_{mean} - P_k) \quad (1)$$

Here, used to control the progressions in position, which consistently takes a worth somewhere in the range of 1.5 and 2. is an arbitrary number somewhere in the range of 0 and 1. As per this stage, in the introduction stage, a bundle is ship off all close to CH hubs by source hub to illuminate the complete number regarding CH hubs in the organization. Additionally, this stage incorporates the area distinguishing proof, distance from the sink computation, and the bunch ID

I. Construction Phase

The bald eagles look for the prey inside the chose space and sped up in various: bearings inside a winding district. The ideal situation for the diving measure is numerically communicated as

$$P_{k,new} = P_k + y(k)*(P_k - P_{k+1}) + x(k)*(P_k - P_{mean}) \quad (2)$$

Here,

$$x(k) = \frac{xr(k)}{\max(|xr|)}, y(k) = \frac{yr(k)}{\max(|yr|)} \quad (3)$$

$$xr(k) = r(k) * \sin(\theta(k)),$$

$$yr(k) = r(k) * \cos(\theta(k)) \quad (4)$$

$$\theta(k) = b * \pi * rand \quad (5)$$

Where, is utilized to distinguish the corner between the main issue and the point search, which takes the worth somewhere in the range of 5 and 10, and R is used to decide the number of cycles, which takes the worth somewhere in the range of 0.5 and 2. Along these lines in the development stage, and energy productive directing way is distinguished. Two stages are remembered for this stage. The initial step incorporates the recognizable proof of the neighbor hubs for every hub and the subsequent advance incorporates the ID of the replacement hub and the working with the hub.

a) Neighbours Identification

The source hub looks for a CH hub with lower profundity inside the transmission reach to distinguish a course with productive energy adjusting. The source hub assigned a scheduled opening for every hub for productive correspondence. This time allotment is again separated into two, which is displayed in fig 4. One portion has the length equivalent to a 4-way handshake. Because of the unique development of organization hubs, all source hubs don't have a neighbor CH hub. As of now,

the hub utilizes a second schedule opening for CH hub recognizable proof.

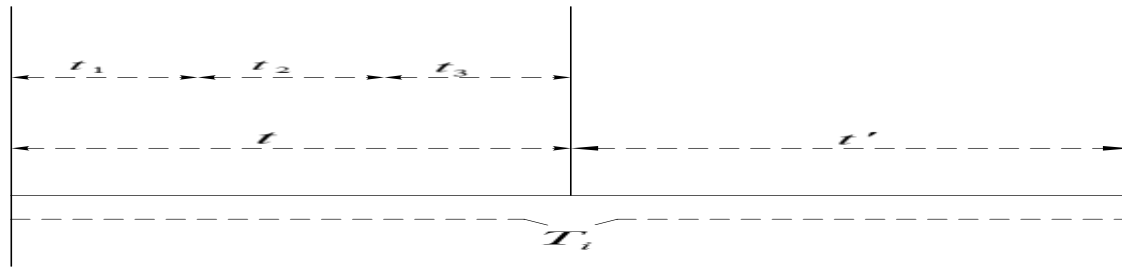


Figure 3: Time slot division

Case 1: A welcome bundle from the hub which is remembered for the area communicated inside the transmission range. Hubs inside this transmission range make an affirmation with the ACK1 parcel. Then, at that point, the hub sends a neighbor solicitation to the hub which is replied with an ACK1 parcel. A hub can just choose its neighbor from the following jump area. Then, at that point, the hub acknowledges the ask for and reacts with the ACK2 parcel.

The hub store the ID of the neighbor hub which replied with ACK2. An effective 4-way handshake is displayed in figure 4 (a).

Case 2: A welcome bundle is communicated inside the ideal transmission range, while the hub doesn't get ACK1 parcel after time. In this way, the hub builds the transmission range, and retransmit the welcome parcel. It is displayed in figure 4 (b).

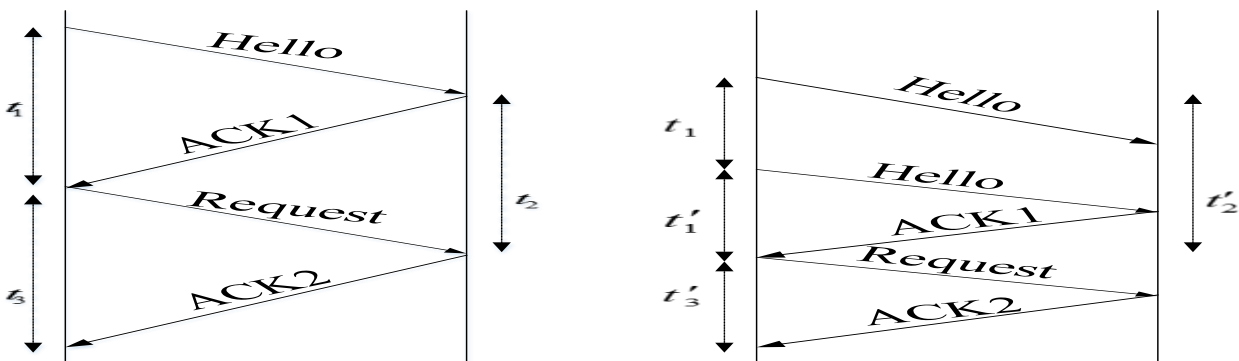


Figure 4: Neighbour finding stage (a) Packet dropped (b) Packet received

a) Optimal path identification

Correspondence is done based on the replacement hub and working with the hub. The determination of energy effective way alludes to the choice of replacement hubs and working with hubs. The hub determination depends on the base energy utilization and it chose dependent on the expense work esteem. On the off chance that the hub speaks with the hub, the expense work esteem is addressed as, then, at that point Q_{mn} , then:

$$Q_{mn} = \alpha \times d(m,n) + (1 - \alpha) \times d(n, \text{sink}) \tag{6}$$

The distance among hub and hub is addressed as and also the distance among hub and sink is addressed as. Then, at that point, the telecom hub ascertains the expense work as an incentive for all the neighbor hubs. After this computation, these qualities are recorded in

rising requests. The hub id for the comparing first worth is chosen as replacement hub and the hub id for the relating second worth is named as working with the hub.

II. Transmission phase

The dipping stage incorporates the swing idea of bald eagles from the best situation to the designated position. The diving stage numerically clarified as follows:

$$P_{i,rev} = rand * P_{best} + x1(k) * (P_i - c1 * P_{best}) + y1 \tag{7}$$

$$x1(k) = \frac{xr(k)}{\max(|xr|)}, y1(k) = \frac{yr(k)}{\max(|yr|)} \tag{8}$$

$$xr(k) = r(k) * \sinh[\theta(k)]$$

$$yr(k) = r(k) * \cosh[\theta(k)] \tag{9}$$

$$\theta(k) = a * \pi * rand, r(k) = \theta(k) \tag{10}$$

$$c1, c2 \in [1,2] \tag{11}$$

The distance between the source and objective hub is recognized on each round. On the off chance that the distance is not exactly the ideal transmission range, the hub straightforwardly sends the information bundle to the objective. On the off chance that this condition comes up short, the hub works out the lingering energy of the replacement CH hub and the working with CH hub. If the leftover energy of the replacement CH hub is more noteworthy than the normal lingering energy of the entire organization, then, at that point the hub

communicates the information bundle towards the replacement CH hub. On the off chance that this condition isn't fulfilled, contrast the normal leftover energy and the remaining energy of the working with CH hub. On the off chance that the leftover energy of the working with CH hub is more prominent than the normal remaining energy, then, at that point, the information bundle is communicated towards the working with CH hub.

IV Simulation

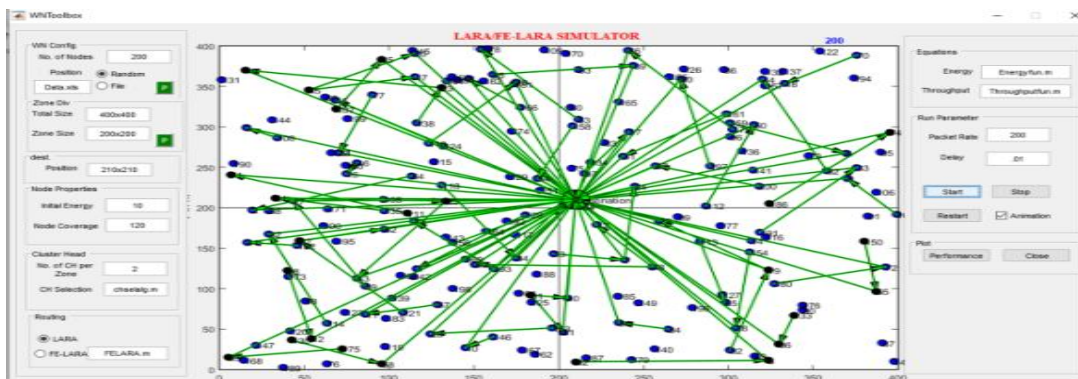


Fig 5: Scenario for 200 nodes with 200 as packet rate

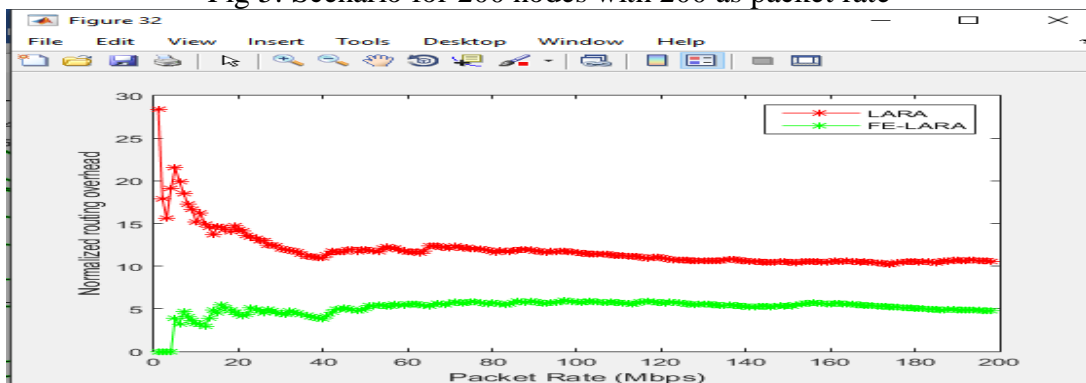


Fig 6: Analysis Graph for normalized routing the overhead of LARA and FE-LARA

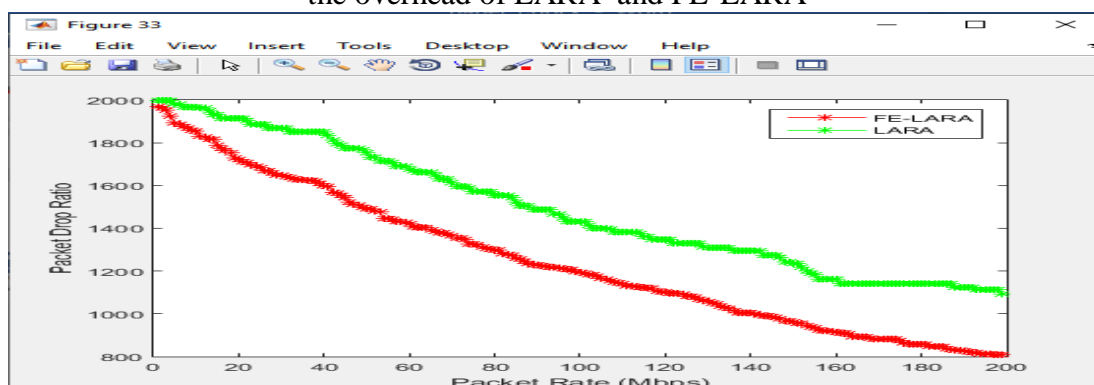


Fig 7: Analysis Graph for packet drop ratio of LARA and FE- LARA

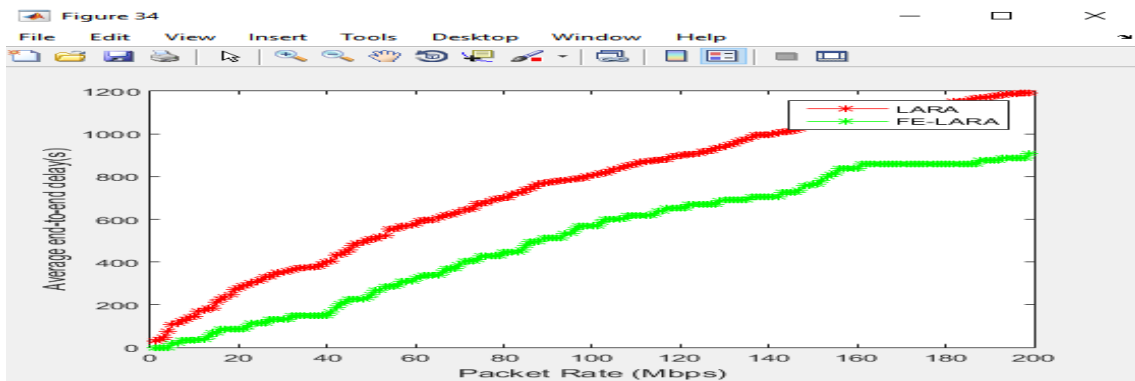


Fig 8: Analysis Graph for normalized routing the overhead of LARA and FE-LARA

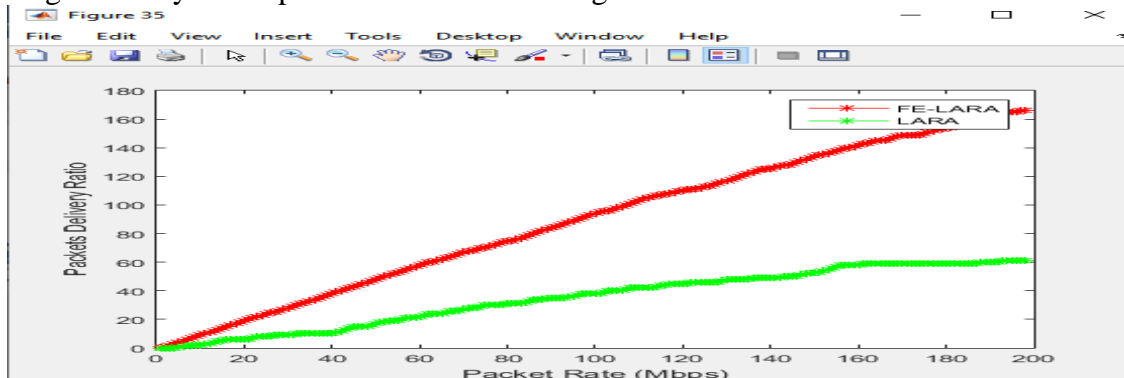


Fig 9: Analysis Graph for packet drop ratio of LARA and FE-LARA

Table 2: Simulation parameters

Simulator	MATLAB
Routing protocols	AODV,AOMDV,BES-AOMDV
Time for Simulation (sec)	500
Area for Simulation	1000*1000
Type of Traffic	CBR/TCP
No. of nodes	100,200,300,400,500
Connection rate	5 packets/s
Range for Transmission	250 m
MAC Type	802.11
Channel Type	Wireless Channel
Antenna Type	Omni directional
Size of Packet	512 bytes
Node Mobility	10 m/sec
Radio Propagation Model	Two Way Ground
Data-payload	512 bytes
Initial Energy	1000 Joules
Node Mobility	10 m/sec

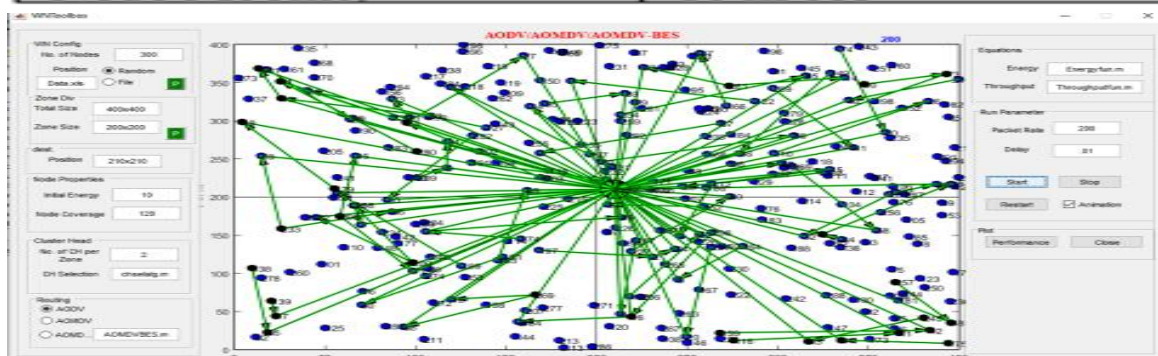


Fig 10: Scenario for 200 nodes with 200 as packet rate

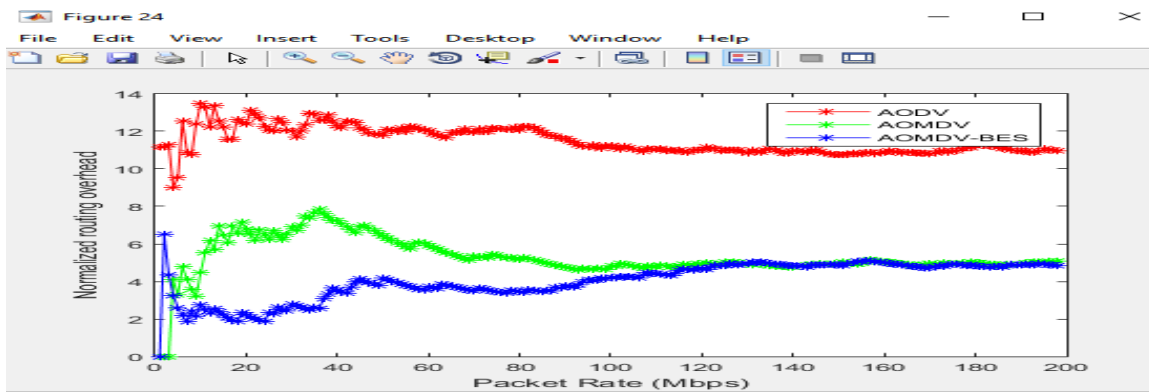


Fig 11: Performance Graph for normalized routing overhead for all algorithms

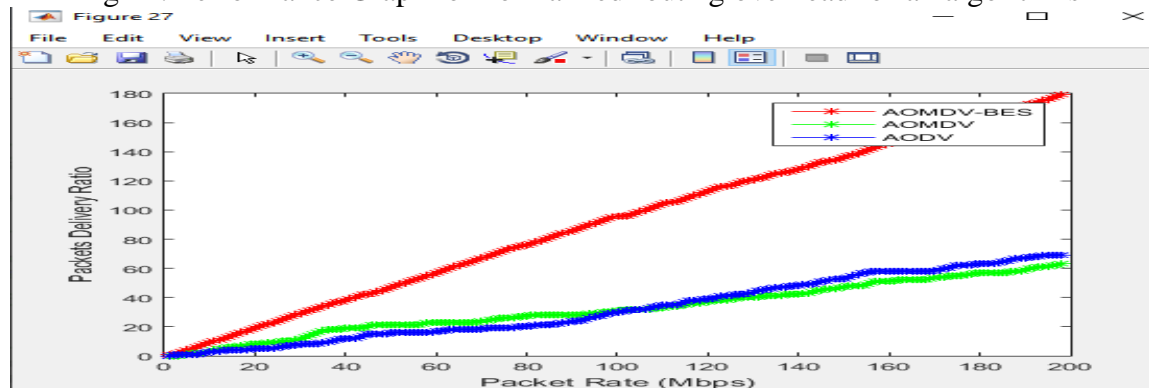


Fig 12: Performance Graph for packet delivery ratio for all algorithms

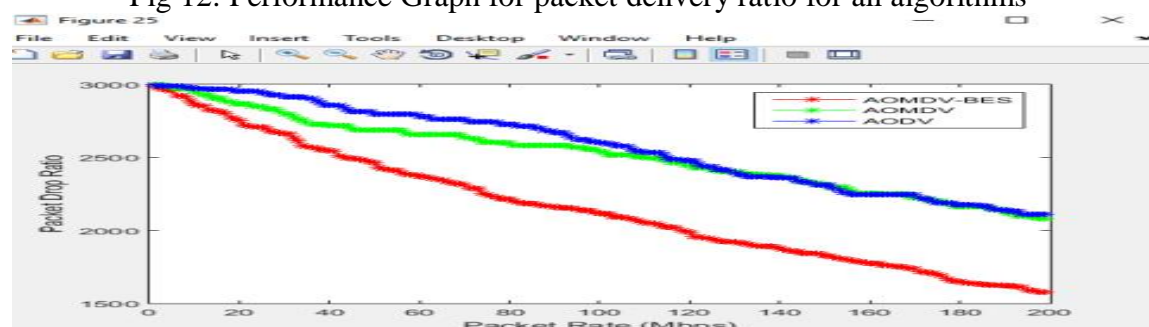


Fig 13: Performance Graph for packet drop ratio for all algorithms

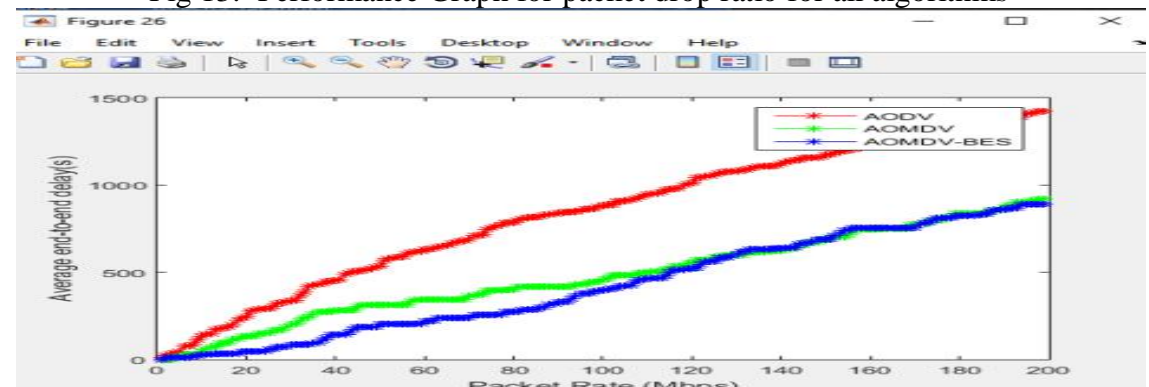


Fig 14: Performance Graph for Average end to end delay for all algorithms

The performance graphs show that the proposed BES-AOMDV algorithm performance is better when compared to various algorithms such as AODV and AOMDV

V Conclusion And Future Work

This paper introduced, the blockage in Wireless organization
 Wireless networks are been exploited for abundant investigational regions for tracing the data assortment. Networks have diverse resource restrictions due to which there is a necessity for modeling efficient routing

procedure for the examination which discover that FE-LARA offers a strong improvement in opposition to winning methodology with LARA

A proficient calculation is proposed Packet misfortune, Packet Delivery Ratio, Average start to finish delay, and standardized steering overhead is determined for changing several dynamic sources and a correlation is accomplished for AOMD, AOMDV, and BES-AOMDV. We are wanting to build the

organization size and to which calculation must be carried out and the efficiency of the calculation is assessed by examining network boundaries.

Acknowledgment

I would like to acknowledge all the paper authors who have provided good work for research scholars as to the basis for further research work.

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- [4] Multipath routing through the firefly algorithm and fuzzy logic in wireless networks air Nader Shahbaz1 · Hamid Baratil · Ali Baratil Received: 7 April 2020 / Accepted: 17 September 2020 © Springer Science+Business Media, LLC, part of Springer Nature 2020.

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Internal Complaint Committee to VTU from GSSSIETW, Best Accredited Student Branch by CSI 2017, 2018 & 2019. Young Scientist Award from AUFAU, VIRA. Has Organized National Competitions /Talk/ Workshop/ Conferences / FDP/ Session / Seminar/Webinars / Student Convention and Received Fund by KSCST in 2017, 2018, 2019 & 2020. Received Funds by (SMYSR). Received Funds from VTU TEQIP 1.3 in 2020. Organizing Chair for 5 IEEE International Conference on Electrical Electronics Communication Computer Technologies & Optimization Techniques ICEECCOT- 2016, 2017, 2018 & 2019 and National Standards) at GSSSIETW. She has published nearly 40 Research papers in International, National Journals/conferences and book chapters.



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A CRITICAL ANALYSIS OF INDIAN SOCIAL MEDIA DYNAMICS

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ABSTRACT

Social media, a term that collectively represents the set of most dynamic media platforms in the contemporary world, constitutes the websites or application-based platforms that allows users to participate with their own content or by viewing others' posts. Subject to its encompassing and expanding nature, social media has been able to gain traction among countless people, with the number growing exponentially with each passing day. Over the past decade in India, social media platforms such as Facebook, Twitter and WhatsApp have become avenues for people to express their opinions. Some such expressions are controversial and lead to social disorder. The spread of certain social media messages led to communal disharmony in the recent past as well. Fake news and viral messages also made the Indian government intervene and take measures. This research paper throws light on a few of the prominent cases from India, where social media played key roles in creating social disorder. The researcher used the case study method to draw an association between multiple cases and the imposition of the new Information Technology regulations by the Indian government. The paper identifies the impact of social media on the social dynamics of India.

Keywords: Social Media, Fake News, Facebook, Twitter, WhatsApp.

Introduction

Social media has become an integral part of life for people from all across the globe. Everybody has at least one social media account, unless she/ he is constrained by the perennial digital divide. As per 2021 data, there are 3.78 billion social media users in the world (Tankovska, 2021). The most famous of them are Facebook with 2,797 million users, YouTube with 2,291 million users and WhatsApp with 2,000 million users (Tankovska, 2021).

According to 2020 data, India ranks second in terms of the country-wise positioning of the total social media users in the world with 349.97 million users. China holds the top rank with 926.84 millions for the same year. One of the most notable characteristics of social media is the fact that its users are prosumers. The term prosumer means that the user is both a consumer as well the producer of the content. For two of the most popular social media platforms i.e. Facebook and YouTube, we can figure out with a little careful observation that illiterate users are also consumers of the platform, if not the producers. Thus the ease of handling the platform is what makes it more publicly acceptable.

With a population of 1.39 billion, India has 624 million internet users as on January 2021, out of which, there are 448 million social media

users. Social media users constitute 32.3 per cent of the total Indian population (Kemp, 2021). Thus, social media is an excellent platform for any entity to do their business in India.

At the same time, social media has created impact amongst a large number of people. It reflects the trends of the society – be it fashion, movies or the most happening news. Over the last decade or so, there have been multiple instances when social media played an important role in the overall social dynamics of India. Thus, the objective of this paper is to highlight the impact of social media on the Indian society with reference to some prominent cases. Further, this paper also talks about the implementation of the new Information Technology 2021 regulation and the strict measures that some social media companies are implementing on their users.

Methodology

In order to understand the impact of social media dynamics in India, the researcher took a collective case study approach. According to Sarah Crowe et. al. collective case study involves studying multiple cases simultaneously (Crowe, et al., 2011). Case studies can be used as a methodology to explain events and phenomenon that happen in everyday life. This research design helps to address who, what, where, when and how for

any observation or issue form the ground. In this research paper, the researcher carefully picked up a number of cases, which eventually designed the inference of this research. The researcher selected relevant and significant cases from 2002 onwards, which created major impact in the Indian society. The reference of such cases were taken from online publications of prominent media outlets and posts from Twitter.

Results and Findings Social Media in India

The leading social media network in India is YouTube with 85.8 per cent of the total social media users. This is followed by Facebook with 75.7 per cent and Instagram with 70.6 per cent. Twitter comes in the fourth position with 50.6 per cent (Desk, 2021).

Let's discuss in detail about each of the platforms and the possible reasons for their public acceptability.

YouTube: YouTube, which is a video portal, is primarily watched for entertainment purposes. It was launched in India on December 15, 2005. We all know the basic features of YouTube, but the interesting fact is that a user can just be a consumer of that platform without feeding any information or comment thus making it extremely easy to use.

Facebook: Facebook was launched in India on September 26, 2006 and was initially used by the affluent class of the society. With an increase in countrywide internet penetration, very cheap data and pocket-friendly smartphones, a large number of internet users opened their Facebook profiles. Since then, socializing has taken a new form in the country. The platform transformed physical interactions into digital interactions. Reading each other's update is just a click away on Facebook. Moreover, considering the innovative features of the other social media platforms, Facebook continuously evolved itself to retain its users. Some of the examples are:

- i) The social post disappearance feature from Snapchat was introduced as Facebook Stories on March 28, 2017.
- ii) Facebook Messenger, a widely accepted instant messenger service on the lines of WhatsApp, was introduced on August 9, 2011.

- iii) Considering YouTube Live, Facebook Live was introduced in 2015.

Facebook introduced many more features, making it acceptable for every type of social media users to use it as per their own necessities.

Instagram: Founded in October 6, 2010, Instagram was launched in India on the same day. As we all know, Instagram is a photo and video sharing platform which also has the 'Story' feature. While it started gaining popularity, the platform was acquired by Facebook for one billion dollars in 2012. The platform gained huge popularity among Generation Z (people born after the year 2000). In the recent times, it has been noticed that almost all media portals in India and also in the world have their Instagram accounts. Reading news in the form of snippets has become the trend now and thus people are following news on Instagram as well.

Twitter: The microblogging platform Twitter was founded on March 21, 2006 and was launched in India in the same year. The platform offers a limit of only 280 characters per post, but has gained huge acceptability among the Indian media organizations and policy makers for being a platform for provocative thoughts. Hashtags, which often get trending, help Tweets to get categorized as per their subjects.

WhatsApp: WhatsApp was founded in February 2009 and was launched in India in the mid of 2010. The instant messaging platform gained traction among users as it was the first of its kind in India to host the transfer of images, audio and video files within a fraction of a second. WhatsApp also introduced voice and video calling features and the company was acquired by Facebook in February 2014. Former union minister Ravi Shankar Prasad said over a press conference in February 2021 that WhatsApp is the most popular app in India with 53 crore (530 million) users in the country followed by YouTube with 44.8 crore (448 million) users in India (Chakravarti, 2021).

It is important to note that the combined entity constituting Facebook, Instagram and WhatsApp has its own business model, where one can create a business account. We all know the quote, "When you don't pay for a product, you are the product." Thus, selecting the

demographic range, a business account can advertise its products to its target customers. Multiple start-ups have started doing their online businesses using these three platforms and doing the financial transaction through e-wallets such as Google Pay, Paytm and the likes.

Recent Crisis over Social Media Posts in India Delhi Riot in February 2020

The infamous Delhi riot of February 2020, associated with the controversial Citizenship (Amendment) Act (CAA) 2019, brought Facebook into the limelight as the social media platform became a hub for online protests and hate speeches. Facebook maintains different stands in different jurisdictions. Until that time, in the United States of America, Facebook was justified in moderation and removal of content. But in India, they stand as a pure social media platform for people to express their thoughts and opinions.

A supreme court bench headed by Justices S K Kaul, Dinesh Maheshwari and Hrishikesh Roy said, "The explosion of information in the digital age is capable of creating new challenges that are insidiously modulating the debate on issues where opinions can be vastly divided. Thus, while social media, on the one hand, is enhancing equal and open dialogues between citizens and policy makers; on the other hand, it has become a tool in the hands of various interest groups, who have recognised its disruptive potential". The bench came heavily on the social media giant, stating that "it has simultaneously become a platform for disruptive messages, voices, and ideologies (Ananthakrishnan, 2021)."

Facebook has its own set of hate speech rules, which are applicable to the accounts promoting violence. The company has 'Dangerous Individuals and Organisations' policy according to which, any Facebook post that supports terrorist attacks, mass murder, hate crimes or organized hate are banned. On August 14, 2020, a report by The Wall Street Journal claimed that the same hate speech rule was not applied to four account holders of the

ruling party and hence Facebook didn't meet its own community standards (Yadav, 2020). To this, the Vice President and Managing Director of Facebook India said, "We have an impartial approach to dealing with content and are strongly governed by our Community Standards. We enforce these policies globally without regard to anyone's political position, party affiliation or religious and cultural belief."

However, in February 2020, Facebook labelled the Delhi riot as 'hate crime' under this policy (Mehrotra, 2020).

Indian Farmers' Protest

In September 2020, the Government of India introduced three farm bills known as Indian Agricultural Act 2020, which was not accepted by the farmers and hence that led to the rise of the Indian farmers' protest. Multiple accounts on Facebook and Twitter started raising voices against the government to repeal the law. A number of YouTube videos from ground zero were also released about the protests. Multiple new accounts on social media platforms were created to post or livestream the protest against the laws.

In December last year, Kisan Ekta Morcha's Facebook page, which reached 9.4 million followers were taken down, that caused outrage among the protesters on the same platform. Facebook later restored the page and regretted for the inconvenience (Desk, 2020). Facebook continued to comply by their set rules and removed posts associated with violation of its community standards.

During the Republic Day celebrations of January 26, 2021, the farmers' peaceful march took a violent turn, which led the Indian intelligence to associate the Khalistan movement, backed by Pakistan, with the movement.

Teenage environmentalist and activist Greta Thunberg's Tweet in support of the Indian farmers' protest raised international attention on this issue.



Image 1: Greta Thunberg’s Tweet in Support of Farmers’ Protest on February 4, 2021

US pop singer Rihanna’s Tweet in support of the Indian farmers was also badly criticised by the Indian government. The pop star on February 2, 2021 tweeted, “Why aren’t we talking about this?”, which resulted the Indian Foreign Ministry to say that “the celebrities

shouldn’t rush to judge without first understanding the facts.” Celebrity adult star Mia Khalifa and US based lawyer Meena Harris also posted Tweets in support of the farmers (Desk, 2021).



Image 2: Rihanna’s Tweet on February 2, 2021

In February 2021, the Ministry of Electronics and Information Technology (MeitY), Government of India asked Twitter to remove 1,178 accounts related to farmers’ protest. The

government further raised questions on Twitter’s neutrality as the company’s CEO Jack Dorsey liked a couple of tweets in support of the protests (Bhargava, 2021). However,

Twitter didn't comply with the order and in a statement, they said that they respect the local law, but at the same time, encourage free speech.

Fake News and its Impact on Social Media

Fake news has become a serious issue in terms of spreading misinformation on social media. Multiple malicious accounts are getting created on Facebook, WhatsApp and Twitter, which aim at spreading misinformation or hatred towards particular groups or communities. The perpetuation of misinformation through social media is not a very new phenomenon. In 2012, the North-eastern Exodus is one such case when thousands of North-East Indians based in Bengaluru started leaving the city in a rush. When asked by The Hindu, some of them said that the Assam media is reporting on violent incidents in Bengaluru and Mysuru (Srivatsa & Kurup, 2012).

The Muzzaffarnagar riot of 2013 was triggered by a fake video, circulated in social media, which led to more than 60 death and thousands to flee their homes. It was a viral fake video showing two boys being brutally slaughtered by a mob. Investigations later found that the video was shot in Pakistan two years before this incident (Desk, 2013).

In 2017, there was a wave of mob attack on innocent people accused to be child abductors across India. This happened by circulating the image of those people on social media. A report published by Business Standard states that between January 1, 2017 and July 5, 2018, 33 people were killed and 99 people were injured in 66 cases of mob lynching..



Image 3: False News on Child Abductors.

Source: Alt News

Fake news played a key role in inciting the violence of the 2020 Delhi Riot. Delhi Police and investigation agencies cracked down on multiple fake messages and social media accounts associated in triggering the violence. Investigations revealed that those fake accounts were spreading fake messages to gather crowd in the riot-hit areas (Srivastava, 2020).

Social Media and the Recent Information Technology Rule

In February 2021, MeITY, Government of India announced a new set of rules for digital media, social media and OTT platforms. The focus of the rules was on self-regulations. The new rules want social media platforms to introduce advanced ways of verifying the accounts. Any social media platform, if being asked by the court or government authority, should give the first source of social media message or as the case may be. The government also wants social media companies to have their Chief Compliance Officer, Nodal Contact Person and Resident Grievance Officer to be citizens of India.

Following the new guidelines, in the first compliance report between May 15, 2021 to June 15, 2021, Facebook identified content violating their community standards and has

taken action against 25 million spam content (Tewari, 2021).

On July 16, 2021, WhatsApp banned over two million users in India for harmful behaviour. In order to keep the commitment of user's privacy, WhatsApp said that they identified those accounts on the basis of information gathered through technological tools and user feedback (Doval, 2021).

Twitter is still in a bitter row and is not exactly following the instructions set by the new IT rules. The micro-blogging platform refused to take down posts as per the instructions of the government authorities, stating that they want to remain a platform of free speech.

Conclusion

The popularity of social media is growing with each passing day. We know that it is used to socialize in the digital world. Thus, distance is not a matter as far as knowing what our friends and family members are doing.

Facebook, WhatsApp and Instagram are widely getting used in India for online businesses. Low-budget start-ups are not investing on developing their websites these days. Instead, they are investing on creating interactive social media accounts to reach their target customers

based on demographic profiles. The social media platforms are also used by companies to build customer relations. Thus, interactive social media presence is the rule of the game now.

But the question is, how much should we depend on social media? If we consider the platforms to be the windows of free speech, then is it worth trusting all public posts looking at the multiple instances discussed in this paper?

As a wise and educated citizen, we should use social media for social good, and the choice of right and wrong lies in the hands of individuals. The big social media giants presently are pushed by the law of the land to abide by the new IT rules introduced in 2021. Thus, the concept of free speech or freedom of expression is in threat. At the same time, looking at the growing threat of fake news and fake viral videos, it was necessary for someone to draw a line somewhere and so it happened. The future will say if an individual is allowed to freely express their dissent against the authority on social media or not.

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A OPTIMIZED FLC OF 3-LEVEL MODULAR MULTILEVEL CONVERTER OF PV WITH DYNAMIC RESPONSE ALONG COMPARISON WITH INCREMENTAL CONDUCTANCE

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ABSTRACT

Now a days the uses of PV system became popular due to its free available in nature. The MPPT techniques are used for the efficiency operation of the PV systems. In this paper Optimized fuzzy logic controller technique is presents for obtaining the maximum power. DEOA is considered in fuzzy logic controller due to its limitation in the P&O and Incremental conductance. The analysis is done for different irradiance level. The proposed method is compared with INC and FLC. The proposed algorithm is analysed for different values of irradiance. The results of the proposed system can be implemented by using the MATLAB/SIMULINK to getting the unity power factor and also power with low losses and with less triples and the displacement of the grid-connected voltage and current.

Keywords: Incremental conductance, optimized fuzzy logic controller, DEOA Algorithm, Fuzzy sets, MMC

Introduction

As the world is moving around with the renewable energy sources, one of the nature gift renewable energy sources is solar energy. Many MPPT techniques have been introduced to extract the maximum power from the PV system. Different inverter topologies are used to convert DC – AC when the PV system is connected to the grid. When compared to the T-Type and 3-level converter topologies modular multi level converter is used because of its advantages. Few are (i) because of its high efficiency, (ii) when the system is connected with the number of subsystems (or) modules, it has high superior hormone performances, which leads to the reduction in size of the passive element and (iii) Capacitor and DC link can be neglected. So many studies have been done from the past years for the operation and control of the modular multilevel converter and facing the technical challenges.

Literature Survey

Non conventional energy sources are being environmental friendly because of its abundant existence, clean and gift of nature [1]. So many studies have been taken place for the implementation of photovoltaic system considering various technical and economical issues in both installation and operation [2]. The day to day increase in demand can be met by installing the Renewable energy power station globally which resolves the technical and economic issues for long-term operation [3-5].

Various MPPT techniques are used to extract the maximum power from the photovoltaic's system when it is connected to the grid to [6-7]. The improved MPPT techniques are explained in [8-9]. Different MPPT models interconnections are proposed in the PV shaded fields grid connected mode [10-12]. We are using two cascaded control loops, for the controlling objectives these two .cascaded control loop in the photovoltaic system consisting of the two portions with outer voltage control for the MPP in the PV system and inner portion is the sinusoidal output current by using the duty ratio of a generation of the power. Controllers like PID, PI Hysterias are explained in the reference paper [13-15] which helps to operate the system of the fixed maximum power point, hence the photovoltaic system exhibit and nonlinear function very strongly along with the nonlinear characteristics of switching functions through irradiance and inverters .Then limitations in the operations of the PV system in nonlinear characteristics can be resolved by implementing nonlinear controllers hence in the grid-connected mode is sliding mode current controller is proposed [16]. In the PV system for nonlinear control design there is a rapid increasing the feedback linearization method where this method helps us to remove the nonlinear characteristics and implement the linear characteristics are proposed [17] for complex mode inverter control design. For complexity nature where using the simple and consistent inverter model [18] for the feedback

linearization technique in the PV system to operate at maximum power point. The single stage grid connected PV system under steady state conditions are explained [19].

In this paper, the 3-level modular multi level converter with Optimized fuzzy logic controller is discussed for the different irradiance levels. The mathematical modelling of PV array and MMC is discussed.

The main objectives of the present work are explained as follows

- The implementation of OFLC the optimised fuzzy logic controller MPPT method for controlling purpose the degree of freedom. .
- The differential evolution optimisation algorithm is used in OFLC.
- The obtained results are compared with INC and FLC methods.
- The analysis is done for different irradiance levels

Mathematical modelling:

The block diagram of the system considered is shown in fig.1. The mathematical modelling of PV system and Modular multi level converter are presented below.

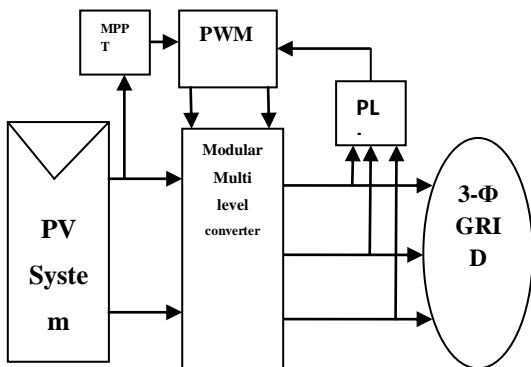


Fig.1. Block diagram of proposed system

PV Array:

The energy in the form of light can be converted into the usable electricity by using the photovoltaic system where the system comprises of the PV array and the system balance component. There are two types of PV is categorised first one is standalone and grid connected mode. The grid connected mode is used in this work.

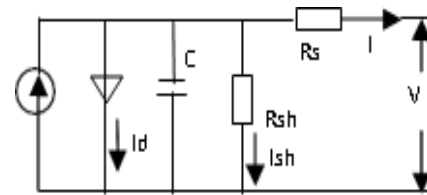


Fig.2. Equivalent circuit of the solar battery

The equivalent circuit diagram is shown in fig.2. It consists solar battery device along with diode.

Where Rsh is the parallel resistance of the system, Rs is the series resistance of the system, Ish is the current passing through the cell, Id is the diode current and C is the capacitance of the system. The diode current is given as

$$I_d = I \exp\left(\frac{qV_d}{nkT} - 1\right) \quad \text{--- (1)}$$

Modular Multi level Converter (MMC):

The block diagram of the MMC is shown in the below figure, where it is a single stage 3-phase connected circuit, this consists of the 2 arm upper and lower arms. Each string in the model is consists of the each Sub modules along with the inductor and capacitor which connected in series.

The nomenclature in the paper is taken as f=p,q,r which indicates the 3-phase, N = No of sub modules, n=1,2,3...N, Z=x,y indicates arms Therefore L= inductance, R= indicates resistance, Vjn = arm voltage, ijn=arm current Vi= AC voltage , io= output current , icf= circulating current.

$$\frac{dV_{fM,n}}{dt} = \frac{S_{fM,N} I_{fM}}{C} \quad \text{--(2)}$$

Where SfM,N is the function of the sub modules.

In the phase f, the voltage and current relation is shown as

$$V_{fM} = \sum_{n=1}^N S_{fM,N} V_{jM,N} \quad \text{-- (3)}$$

By applying Kirchhoff's current law the dynamic behaviors of MMC in phase j shown below as

$$V_{fv} + Ri_{fv} + L \frac{di_{fv}}{dt} + R_{of} i_{of} \frac{di_{of}}{dt} + V_j - \frac{V_{dc}}{2} = 0 \quad (4)$$

$$V_{fl} + Ri_{fl} + L \frac{di_{fl}}{dt} - R_{of} i_{of} - LL_{oj} \frac{di_{of}}{dt} - V_j - \frac{V_{dc}}{2} = 0 \quad (5)$$

$$I_{of} = I_{fv} - I_{fl} \quad (6)$$

Similarly the current equation can be taken has

$$I_{fv} = \frac{i_{of}}{2} + i_{cf}, I_{fl} = -\frac{i_{of}}{2} + i_{cf} \quad (7)$$

Then the circulating current can be taken as

$$I_{cf} = i_{fv} + i_{fl} \quad (8)$$

Sub (4) and (6) in eq(5) then the ac side dynamic current in phase can be taken as

$$\frac{di_{of}}{dt} = -R + \frac{2R_{of}}{L} + 3L_{of} - \frac{1}{L} + \frac{2L_{of}V_{jv}}{L} + 2L_{of}V_{jl} - \frac{2}{L} + 2L_{oj}V_{jl} - \frac{2}{L} + 2L_{of}V_j \quad (9)$$

Substitute 4 and 8 in eq (5) then

$$\frac{di_{cf}}{dt} = -\frac{R}{L}i_{cf} - \frac{2}{2L}V_{jv} - \frac{1}{2L}V_{jl} + 1/2LV_{dc} \quad (10)$$

3-Level Modular Multi level Converter with Incremental Conductance :

The drawbacks of the Perturb and observe algorithm can be overcome by the incremental conductance method. The voltage fluctuations can be minimized by avoiding the power output oscillations occurred at the steady state conditions. The voltage fluctuation is small when compared to the perturb and observe method. It is observed that incremental conductance method is flexible. The main advantage of the incremental conductance are that it is a derivative of the power with respect to the voltage by making zero at the maximum power point conditions. The complete

mathematical modeling of the incremental conductance is discussed [19].

3-Level Modular Multi level Converter with Fuzzy logic controller:

Fuzzy logic controller is a mathematical model that helps us to analyse inputs of analog into logical Variable where it continuously lies between 0 and 1. There is a wide range of fuzzy logic controller when it is enhanced with other models like classical and logic [21].

The fig.3 shows the FLC flow of the system which includes Fuzzification, define rules and defuzzification. The input crisp variables are converted into linguistic variables. According to the membership functions in the first stage the linguistic variables are taken as the input variables to perform the system, 2nd stage is the define rules which includes if and then rules to generate the output third stage is the output of the fuzzification is converted into other using variables of crisp. FLC system which includes two inputs and one output is used for obtaining maximum power point when the PV system is connected to the grid.

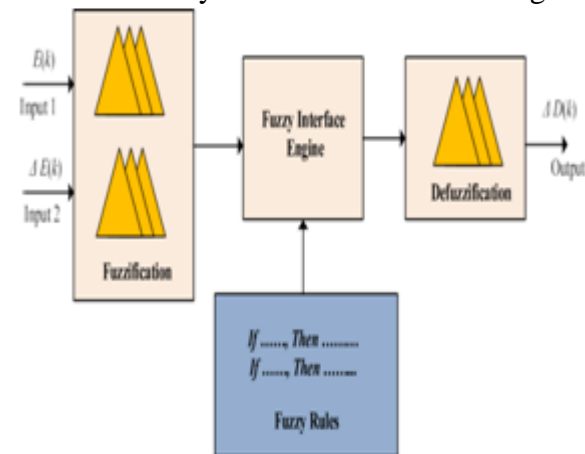


Figure.3. FLC flow of the MPPT Methods

The fuzzy set is proposed in the system with Seven rules included in the process are Negative small(NS), Positive small(PS) positive big(PB), positive medium(PM), negative medium(NM), negative big(NB) and Zero.

The output current of the system is expressed as

$$I_{pv} = N_p I_L - N_p I_s \exp \left[\frac{V_{pv}}{N_s} + R_s I_{pv} / N_p \right] - 1 - N_p / R_{sh} (V_{pv} / N_s + R_s I_{pv} / N_p) \tag{12}$$

Algorithm for the PV system:

In the power system, to solve the optimization problems the most popular method is used is differential evolution optimisation algorithm (DEOA). The method is depends on the number of populations used in the system. The process involved in this method is selection, mutation and crossover. The optimisation method is the trial and error method and target vector system. The proposed technique is explained by the fuzzy membership functions. The voltage and current of the PV system are considered as input variables and the obtained reference voltage is output variable. The factors of mutation are used to determine the selected vectors. The mutation factor/phase can be expressed as below [20]

$$yI_i = y_{best} + Z(yq_i - yq_{ii}) \tag{13}$$

Where Qi and Qii are the integers for different values and Z is the mutation factor. The below equations helps us to find the elements created and placed it in the determine range.

$$yV_i = \begin{cases} y_{max}, & \text{if } yQ_i > y_{max} \\ y_{min}, & \text{if } yQ_i < y_{min} \end{cases} \tag{15}$$

The Trail vector method can be created by using the crossover phase relation

$$yV_i = \begin{cases} yq_i, & \text{if } Q > c_r \\ y_i, & \text{other wise} \end{cases} \tag{16}$$

Where Cr is the crossover phase control parameter.

Simulation Results:

The proposed system is analysed using incremental conductance, fuzzy logic and Optimized Fuzzy logic controllers to study the output parameters. The parameters considered for analysis is shown in Table 1 .

Table.1 Parameters of the system

S. No.	Description	Value
1.	3-Phase Grid Voltage	415V (rms)
2.	Inductor	2e-6H
3.	Resistance	0.01 Ω
4.	Switching frequency	5000Hz
5.	Vdcref	720V
26.	Capacitor, Cdc	3300µF
7.	Open circuit voltageVoc	37.5V
8.	Short circuit current Isc	3.3A
9.	Supply Frequency	50Hz
10.	Interface inductance	5mH
11.	Operating Temperature	1000

3-level Modular Multi Level Converter with Incremental conductance:

The proposed system is analysed with INC method and the output waveforms are shown below.

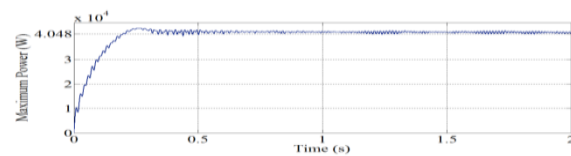


Fig .3. Represents the output waveforms of the PV power

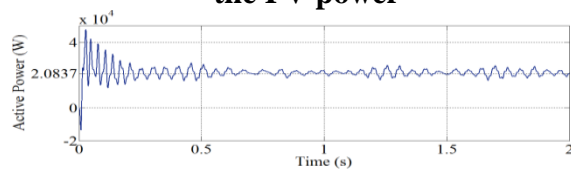


Fig 4: Represents the output waveforms of the Active power

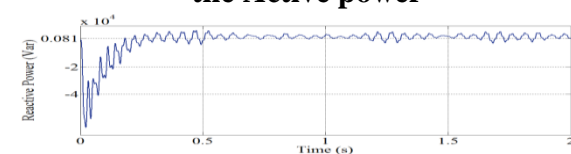


Fig 5. Represents the output waveforms of the Reactive power



Fig .6. Represents the output waveforms of the power factor

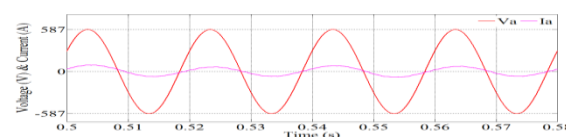


Fig .7. Represents the output waveforms of the displacement voltage and current

3-level Modular Multi Level Converter with Fuzzy logic controller:

MMC with fuzzy controller method is compared with the incremental conductance at normal operating point, here the MPPT controller is succeed in getting a system to operate at fast-tracking of the maximum power point of the photovoltaic's system Hence it proved that FLC is having a good normal starting point performance. This method is having less fluctuation when compared with the incremental conductance method.

The incremental conductance and P&O are slowest responses when compared with FLC. The output waveforms are shown below.

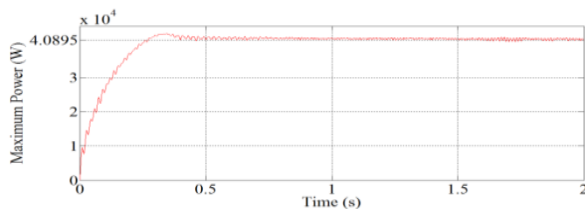


Fig .8. Represents the output waveforms of the PV Power

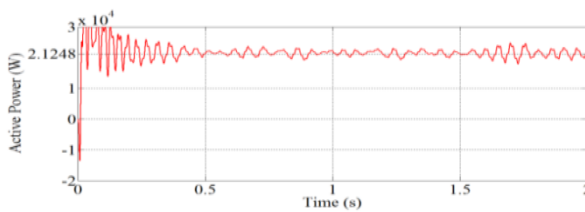


Fig.9. represents the output waveforms of the Active Power

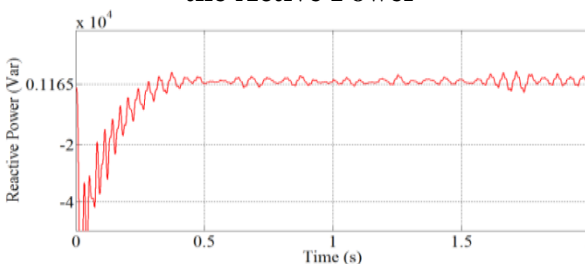


Fig.10. represents the output waveforms of the Reactive Power

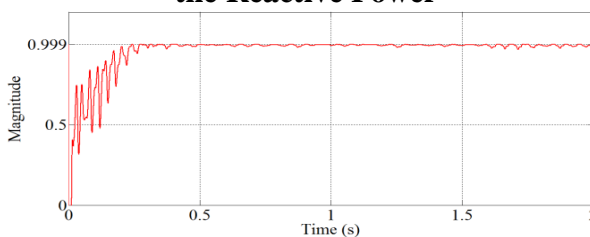


Fig.11. represents the output waveforms of the Power Factor

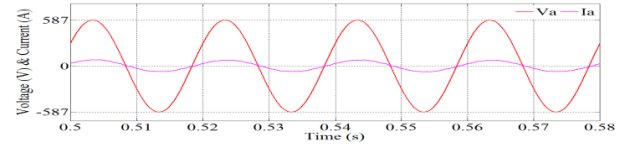


Fig.12. Represents the output waveforms of the Voltage and current

3-level Modular Multi Level Converter with optimized Fuzzy logic controller.

The above methods are analysed for the constant irradiance level. To analyse the system for different irradiance levels optimised FLC is used. In this work, the irradiance levels of 800,1000 and 1200 W/m² are considered. Hence the output waveform of the photovoltaic system is controlled by using the proposed OFLC which helps to improve the efficiency of the system by reducing the reactive power losses and improving the active power. This proposed method also reduces the settling time.

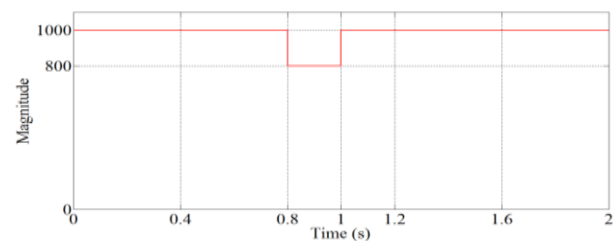


Fig .13. Represents the output waveforms of the Irradiation

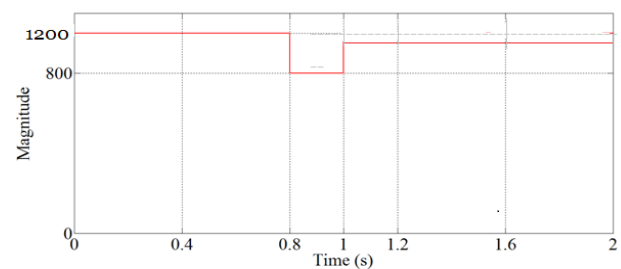


Fig .14. Represents the output waveforms of the Irradiation

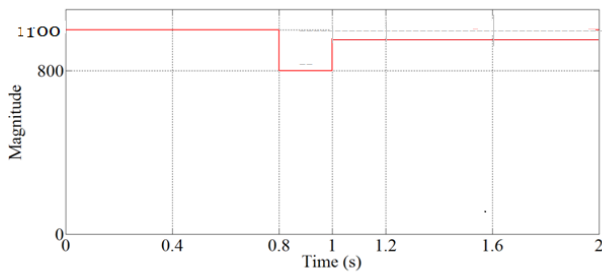


Fig .15. Represent s the output waveforms of the Irradiation

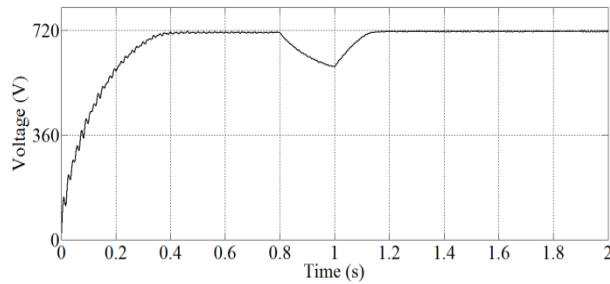


Fig.16. Represents the output waveforms of the DC Voltage

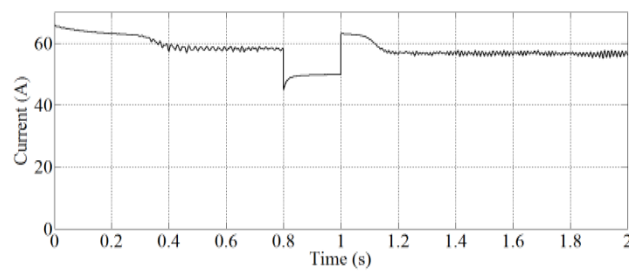


Fig .17. Represents the output waveforms of the DC current

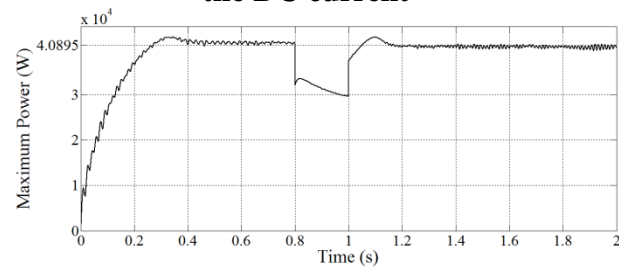


Fig.18. Represents the output waveforms of the PV Power

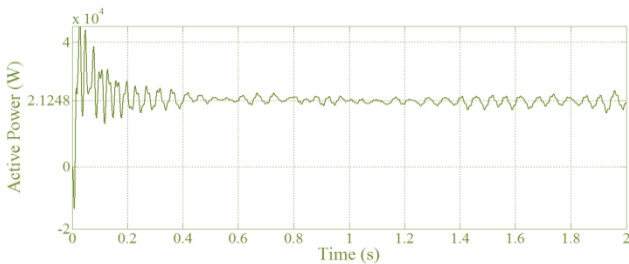


Fig.19 Represents the output waveforms of the Active Power

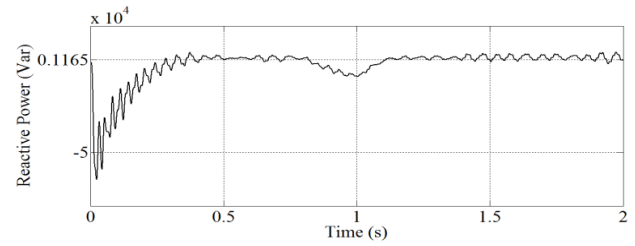


Fig.20. Represents the output waveforms of the Reactive Power

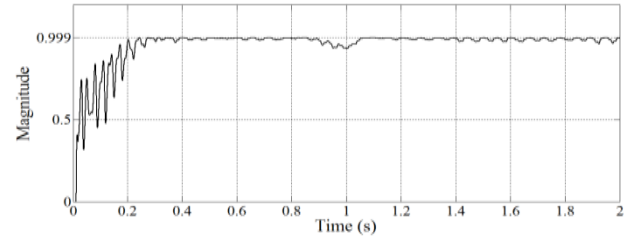


Fig.19. Represents the output waveforms of the Power Factor

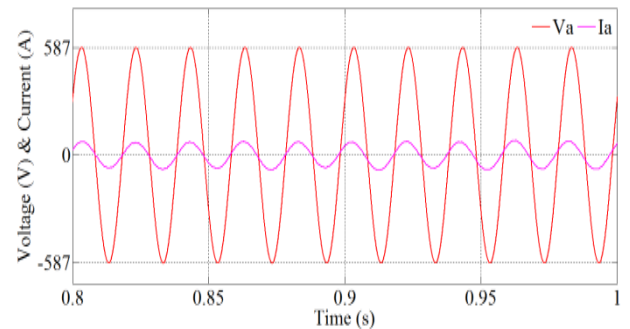


Fig.20. Represents the output waveforms of the Voltage and current

By comparing all the different methods it is observed FLC method achieves less output ripples, and the settling time is less in OFLC when compared to other methods.

Conclusions

In this paper, 3 level MMC with optimizing fuzzy logic controller of MPPT is proposed for PV system. The high performance of optimized logic controller is obtained when compared with the other control topologies. The reactive power is minimized and power factor is improved. The response of the PV system for different irradiance level is studied.

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A STUDY OF ASPHALTENE PRECIPITATION PROBLEMS IN SOUTHERN IRAQI FIELDS

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ABSTRACT

Asphaltene precipitation is one of crucial problems in oil well production that can lead to unpredictable production trends in oil industry. Several authors have investigated the precipitation of asphaltene and to predict onset of asphaltene, but the problem has not been fully understood yet. In general, two major concepts were proposed to describe the mechanism of asphaltene deposition. The first principle suggests that asphaltene can be dissolved in true liquid state which potential precipitate based on the thermodynamic states; pressure, temperature and fluid composition, while the other principle describe as phaltene to be soil particles which is suspended collide in the crude oil as stabilized by resin modules. The solution of adjustment production system design can be considered as a first step to mitigate asphaltene formation in production system. SARA analysis (Saturate, Aromatic, Resins, and Asphaltene) is a proactive analysis to the crude oil to anticipate the likelihood of asphaltene deposition. It is worth to state the two major evidence of asphaltene deposition, it mostly occurs within bubble point pressure as well as the likelihood of asphaltene precipitation is encountered in light crude oil. There for a deep investigation of oil composition as well as well operation condition should be conducted that require fully integrated design of production system to come up with the optimum operating conditions. In this research, several offset wells that suffers from asphaltene deposition have been analyzed based on the operating pressure, temperature profile, PLT log, SARA analysis and production system design.

Keywords: Asphaltene; Thermodynamic States; SARA Analysis; Aromatic; PLT log

1. Introduction

Asphaltene is of the convoluted problem in oil an industry that lead to detrimental effect on the oil production and deteriorate the field development plan. In fact, the asphaltene precipitation cause block off the production path for the oil and eventually lead to shut down the oil well. Many authors have investigated the root causes of asphaltene and some of them related the problem to the alteration in the pressure, temperature and composition of the oil (Alsubaih, et.al., 2019). While the second school of researchers considers asphaltenes to be solid particles, which are suspended colloiddally in the crude oil and are stabilized by large resin molecules. However, the problem is not fully understood and expensive cleanup operation are required to re-operate the oil well after being shut down. Basically, the problem may evolve an any stage of the life of oil well especial if the type of oil ranging from light to medium oil. Interestingly, the asphaltene precipitation is rarely occurred in heavy oil if it is operated efficiently (Alsubaih, et.al., 2020). The well is considered in onset of asphaltene problem if it is having high under saturated pressure and consequently the deposition taking place around the saturation pressure (Aqrawi, et.al., 2010).

The general proactive procedure is to operate the oil well in the recommended condition by selecting the appropriate choke size bottom hole pressure, and the tubing size which the pith of this paper. Therefore, meticulous monitoring of the production condition is necessitating to ensure asphaltene free production along with trenchant well design. Studying the composition of the crude oil is also crucial in prognosticate the root cause of the asphaltene precipitation that routinely conducted through SARA analysis. Away from formation damage and alteration to the reservoir wett ability, the asphaltene depositing causes a damage to production system component. It is considering a serious petroleum production problem and should be treated efficiency. Contacting the asphaltene envelop is of the effective method to determine the upper and lower limited of the operation pressure in which the asphaltene can be commencement (Ayhan, 2002). Furthermore, the tubing size design with a proper choke size can make big different avoiding this problem. In this paper, several oil well that experience asphaltene problem have investigating and production logs have interpreted in a field in southern Iraq for X- limestone reservoir. Then, asphaltene envelop has constructed to bounded the operation pressure within the safe

conditions. After that, the appropriate chosed and tubing design have suggested to mitigate the flow blockage in these wells.

2. Reservoir Background

X- reservoir is a lower cretaceous formation, which is one of the main producing reservoirs in the south of Iraq. It is comprised of oil-bearing sandstone interbedded with shale sequences with different extension and connectivity between the layers (Khaleel, 2015, Alsubaih, et.al., 2020. Ahmed, et.al, 2021). Some of these shale layers are totally impermeable; therefore, they divide the reservoir in three major units with different formation quality and oil properties; A, B, and C units. Units A and C has similar quality and oil properties (API = 24), while unit B has lighter oil of 32 API. Oil reserve in unit B was estimated to be 72% of the total reserve in X-reservoir, whereas unit A was estimated to have 12 % and the remaining 16% in unit C. Reservoir and aquifer connectivity were observed to be relatively poor in units A and C while this weak aquifer support totally disappear in unit B as shown in Fig. 1.

3. Asphaltene Chemistry

Asphaltene is defined as heaviest and most polarized component of petroleum fluid. It is not pure component and consisting of thousands of solubility like species that various in chemical structure, size and shape. On the other hand, asphaltene species have many common features; it is containing n-alkane chains, cyclic alkanes as well as polynuclear aromatics (Siavash, et.al., 2017, Speight and Moschopedis, 1982). Furthermore, it possesses heavy metal such as nickel and iron. Sulphur, nitrogen and oxygen are the heteroatom that also present in asphaltene. Its imputed as well dissolved in aromatic solvent such as benzene, xylene, and toluene but it is not solvable in normal alkane solvent like normal heptane and hexane.

4. Methodology

4(a) SARA Analysis

SARA analysis is the breakdown of the percentage of the saturate, aromatic, resin, and asphaltene in the crude oil. Theory of SARA is come from the classic school of colloidal that assume the core of solid particles are composed

of asphaltene surrounded by aromatic and resin. This concept is widely used in oil industry to determine the potential of asphaltene deposition. It is well understood that reservoir with high asphaltene fraction may not suffering from deposition but rather the reservoir with high saturated fraction may be candidate for it (Speight and Moschopedis, 1982, Raad and Ayad, 2020). The SARA analysis is illustrated in the Fig.2 and procedure of this analysis is out of the paper scope.

4(b) Colloidal Instability Index (CII)

It is defined as the ratio of sum asphaltene and saturate to the sum of resin and aromatic. It is used to indicate the susceptibility of the crude oil to onset asphaltene. CII calculate by formula Eq. (1) (Raad and Ayad, 2020):

$$CII = \frac{\text{Saturated} + \text{Asphaltene}}{\text{Aromatic} + \text{Resins}} \quad (1)$$

Colloidal instability index is utilized to measure the stability of the crude oil as the crude oil stable that mean the asphaltene will not precipitate. The quantitate evaluation of CII indicate that when CII value less than 0.7 the crude is stable and when it is greater than 0.9 the crude oil is unstable. The value between 0.7 to 0.9 is considered as mild present of asphaltene problem in other word it may or may not occur (Siavash, et.al., 2017 and Romanova, et.al., 2006).

4(c) The Asphaltene Problems in Southern Iraq

Asphaltene problems in some X- reservoir wells in southern Iraq fields and find an effective solution. Numerous wells experience flow assurance caused by asphaltene that led to shut in the wells and then rub PLT (production log tool). Table 1 show some wells that experience asphaltene problems with the operation parameters. The majority of this wells are dry well or they have really low water cut. The reservoir pressure of these wells is found to a bit above Psat and it is gradually declining during the last two years.

4(d) Well #1 Asphaltene Diagnostic Analysis

The four PLT surveys shows significant variation in temperature and pressure in the wellbore at different time of production. As the

conditions are changing and moving toward the Asphaltene envelope, asphaltene was forming in the wellbore at depth of 3000m and it affected the speed of the spinner. 3000 psi, 180F as shown in Fig.3.

4(e) Well #2 Asphaltene Diagnostic Analysis

Asphaltene was observed to be depositing at depth of 2800 to 3000 psi as the pressure and temperature in this interval is within the asphaltene deposition envelope. It can be noticed the Asphaltenes have an effect on Spinner curves as shown in Figs. (4 and 5). The bigger opening of choke help to minimize asphaltene effects as the rate was higher so it helps to wash out the deposited asphaltene.

5. Results and Discussion

5(a) Thermodynamic Equilibrium Core of the Asphaltene and Tubing Size Investigation

The alteration in the thermodynamic equilibrium is core of the asphaltene remediation in the paper. As clearly find out the problem is observed in the depth interval in which the pressure drop reach to the bubble point pressure. This fact considers a key factor that the designer should consider when the asphaltene inimitable. Thus, it is crucial to design the tubing and choke sizes that insure shallow asphaltene dropout that consequently cause ow hydrostatic column and sufficient pressure to push the asphaltene out. According to asphaltene envelop, the pressure range to onset dropout is 2605 to 3270 psi while the temperature bounded between 158 to 210 F. The saturation pressure is around 3050 psi while reservoir temperature 210 F.

Fig.6 show the investigation of different tubing size and it can be concluded that tubing size of 5 inch is sufficient to achieve the required driving force to push the asphaltene and mitigate the effectiveness of tubing blockage.

In other hand, the later conclusion in agreement with pressure drop for tubing 5 inch as illustrate in Fig.7 which more than 2000 psi.

The choke sizes evaluation for 5-inch tubing can be buttress the concept of priding sufficient lifting force to the hydrocarbons inside the tubing that reach to 2200 psi when 0.75 choke being used as indicated in Fig.8. However, the production rate has decrease from 3000 STB/day to 2500 STB/day but it is help significantly in mitigate the rate of asphaltene precipitation.

5(b) SARA Analysis and Colloidal Instability Index (CII)

The offset wells data from field in southern Iraq have been collected and used in this analysis. The SARA and CII have summarized in Table 2 for two wells. Then PVT and reservoir properties data were fed to a commercial software to predict the onset of the asphaltene. Also, production history of the wells was investigated and revealed the choke sizes were not properly selected.

All last date has fed to a commercial software and asphaltene envelop were constructed in which the upper and lower limit of the onset asphaltene has determined in different range of temperatures as shown in Fig.9. After that, since the asphaltene precipitation have been diagnostic in different depth interval inside the tuning, pressure gradient analysis has conducted.

6. Conclusion

The design of the petroleum production system components has massive effect on the overall thermodynamic that related directly on the asphaltene dropout. By changing the tubing, choke sizes and production rate the likelihood of the onset asphaltene can be reduced by proving sufficient pressure to left any accumulation to undesired product out of the tubing. This method can make big different in remediation and mitigation this problem in cost effective manner.

7. Acknowledgements

Author is grateful to Basrah Oil Compony Central Laboratory to carried out this research work.

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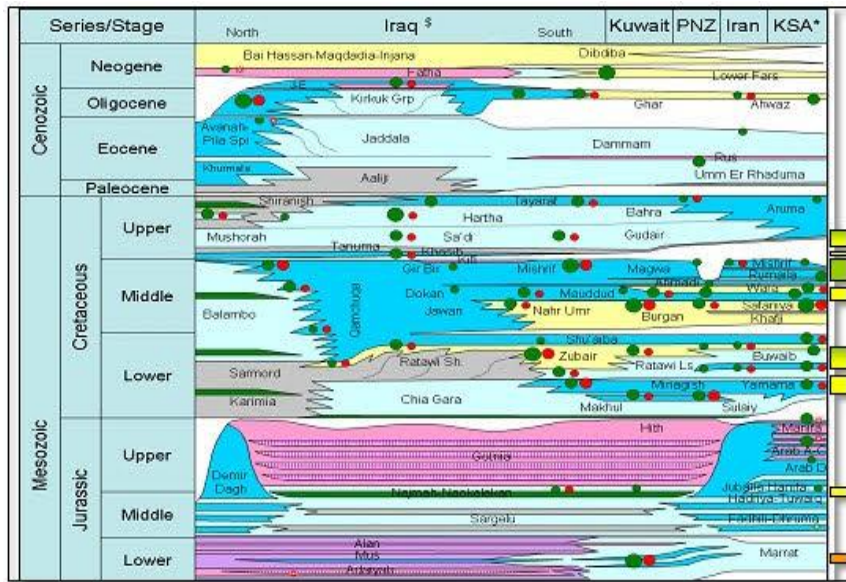


Figure 1: X- Reservoir in Southern Iraq

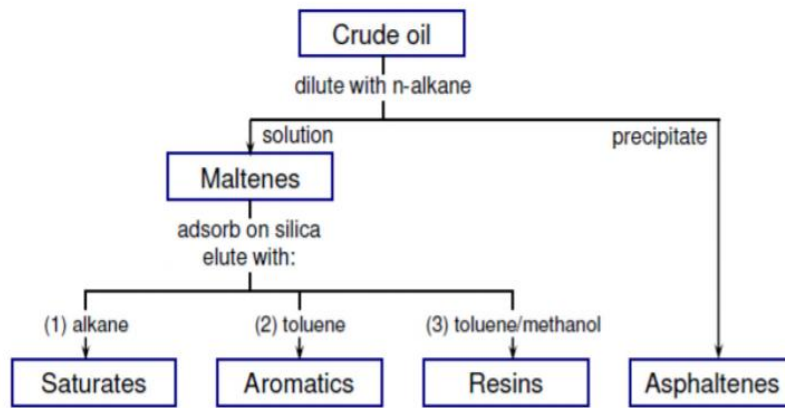


Figure 2: SARA Analysis.

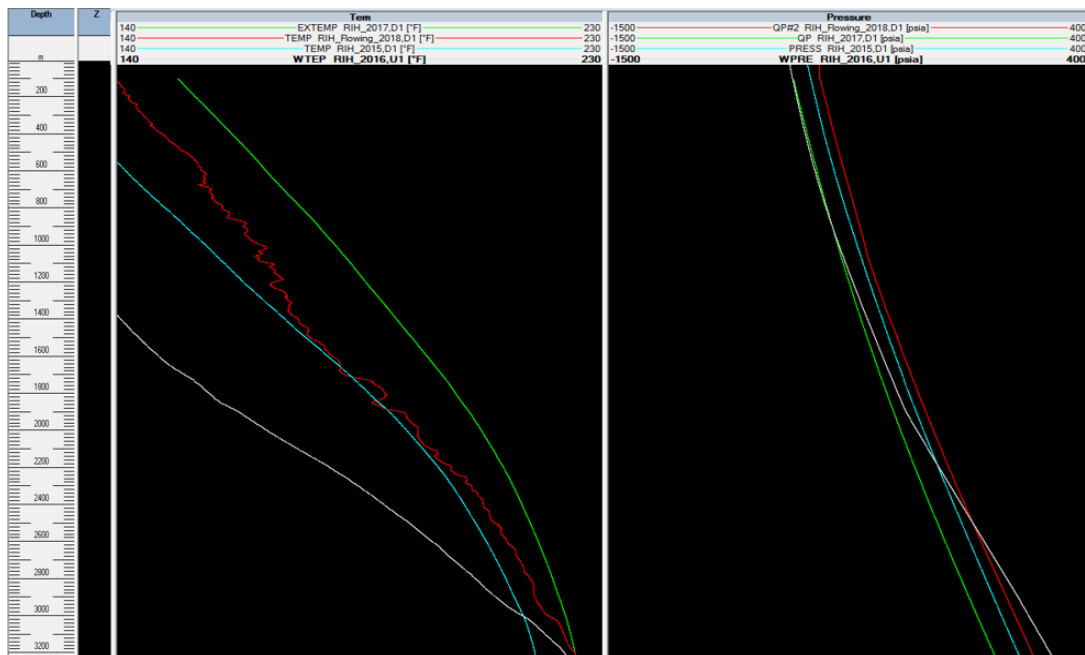


Figure 3: PLT Log for Well #1.

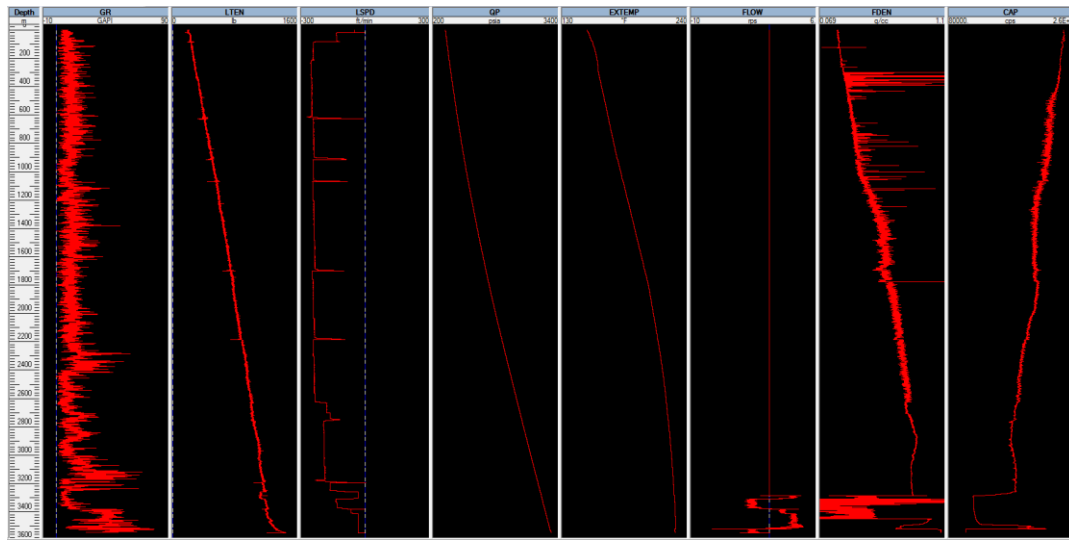


Figure 4: PLT Log for Well #2



Figure 5: The Asphaltene Accumulation Effect on PLT Tool.

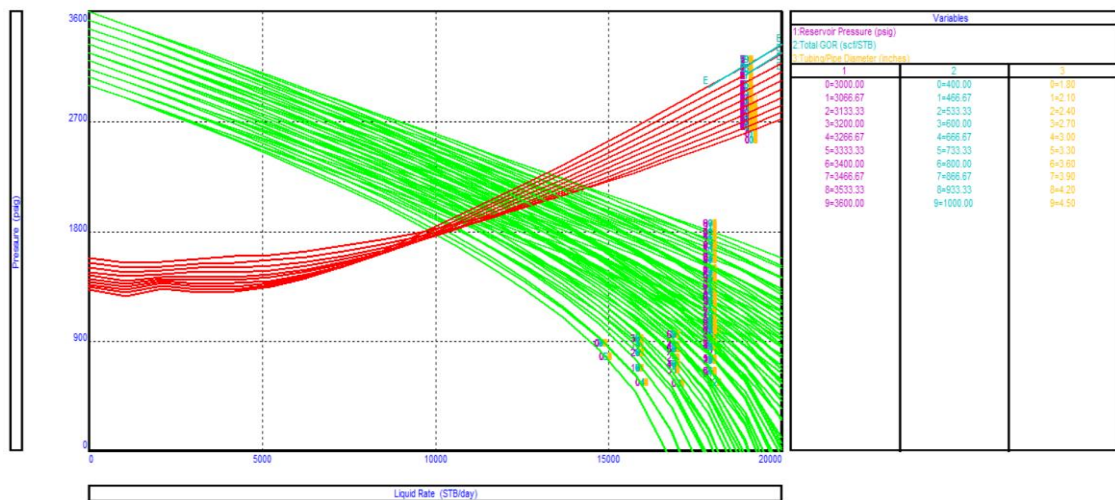


Figure 6: Tubing Size Investigation

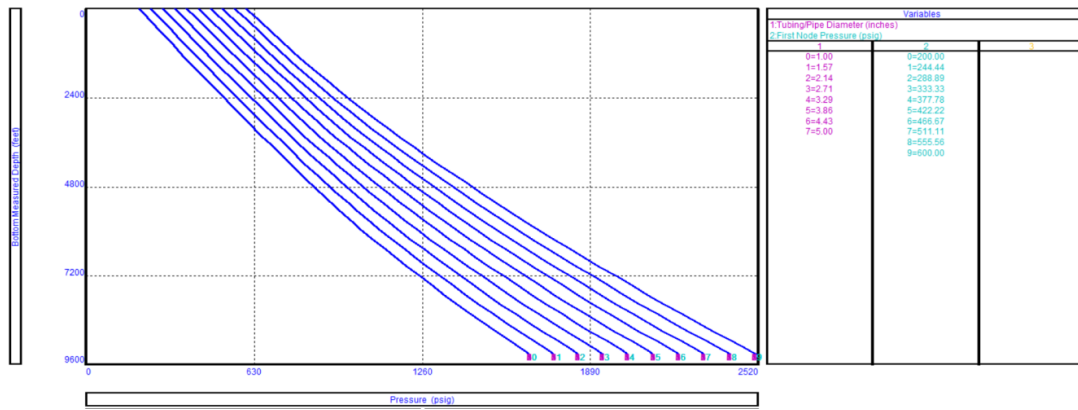


Figure 7: Pressure Gradient for Several Wells

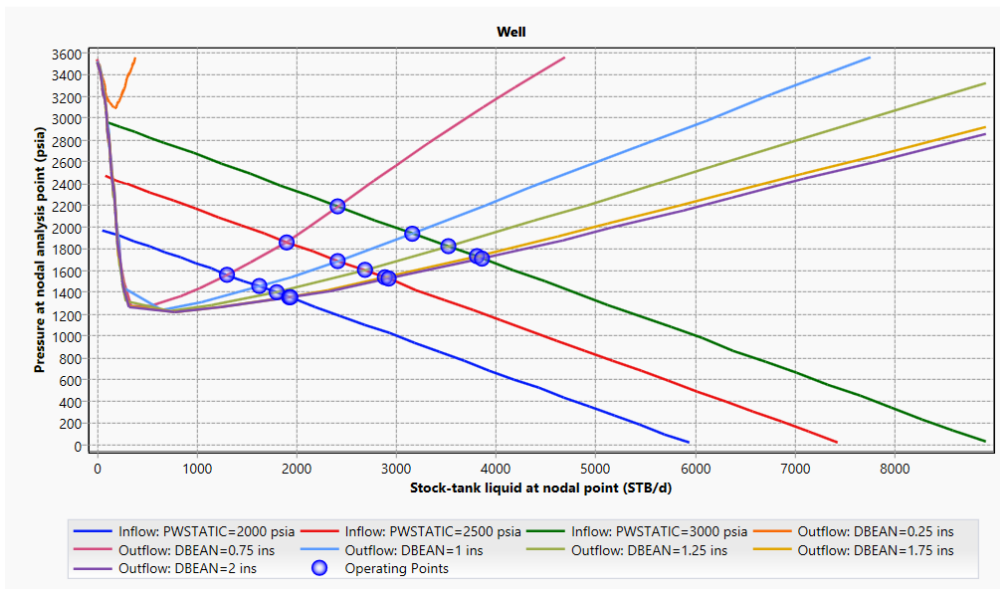


Figure 8: Investigation of Choke Performance.

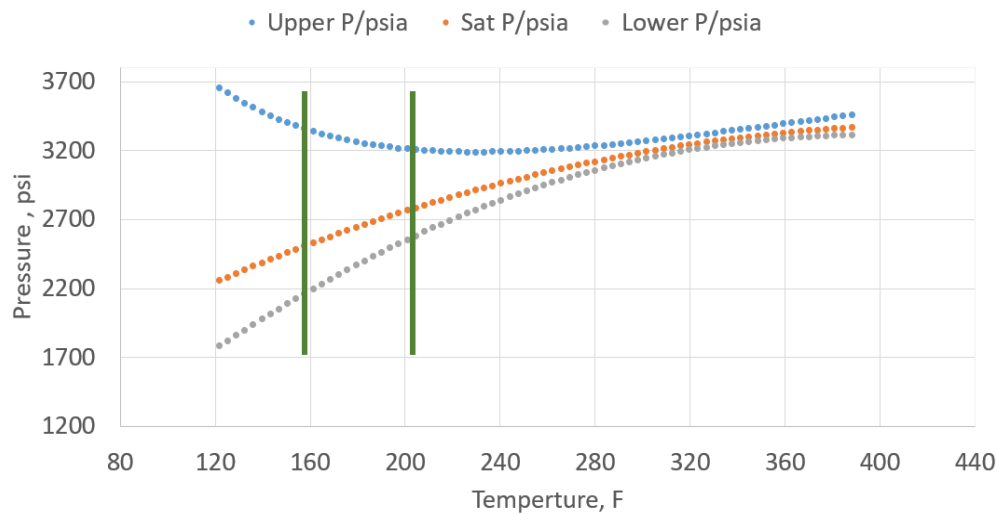


Figure 9: Asphaltene Envelop

Table 1: Production History For Some Wells in Southern Iraq

Well	Utility	Status	Pressure (Psia)	Date	Production rate bbl/day	Choke
1	Producer	Flowing	3401	2018	2815	32
2	Producer	Flowing	3512	2018	3697	74
3	Producer	Flowing	3404	2018	2740	50
4	Producer	Shut in	3490	2018	≈1500	
5	Producer	Flowing	4043	2018	4534	64
6	Producer	Flowing	3778	2017	4050	50
7	Producer	Flowing	3755	2018	2554	32

Table 2: SARA Analysis for Two Wells in Southern Iraq

Properties	Well #1	Well #2	unit
Wax Appearance Temperature	18.5	<-3.0	°C
Wax Dissolving Temperature	30	<-3.0	°C
Total Acid Number	0.05	0.03	mg KOH/g
SARA Analysis			
Saturates	49.4	27.7	% wt
Aromatics	37.4	47.8	% wt
Resins	11.0	14	% wt
Asphaltenes	2.2	10.5	% wt
CII	1.06	0.62	

A STUDY OF JOB STRESS AMONG WOMEN TEACHER IN DELHI NCR, (NOIDA, GHAZIABAD FARIDABAD)

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ABSTRACT

The study determined the job stress among teachers in Delhi NCR, Noida, Ghaziabad Faridabad. A literature review and Secondary data was used to gather information from the subjects' teachers. Majority of the teachers have headache as symptom of poor health and majority of them engage in watching TV and doing cooking as a strategy for coping with stress. The major source of stress for the subjects is the society. It was recommended among others that, teachers working condition should be improved by planning educational ergonomics and of some social facilities such as: satellite TV; computer connected with different traditional Punjabi and Biharidishes some time continental and started over spending of money on maids , Internet; and that the school curriculum should take into cognizance, sporting activities especially for the teachers which should be given a bit of knowledge in health education so to be able to understand themselves and generate more coping techniques for job stress.

Keywords: Job Stress

1. Introduction

There has been an enormous increase in research into job stress over the last decade. Many studies have implicated stress in the etiology of a number of physical and psychiatric ailments (Coronary heart disease), skin diseases, Ulcers, e.t.c. (House, 2007; Copper, 2005). In addition, job stress can hinder effectiveness at work and can lead to low performance, job dissatisfaction, poor motivation, absenteeism and turnover (Copper, 2002) Due to increased responsibilities and demanding deadlines, teaching nowadays is more stressful than ever. It has been recognized for several decades that teachers experience work-related stress on daily basis and this fact has been the focus of extensive research.

According to Cox et al. 78% of teachers consider work as the main source of stress in their lives while the same is true for only 38% of other professionals, most people who engage in teaching today hold on to the job because they have nothing else to do. Even though, they teach to earn their living yet, they engage in the job pending the time, they get a better offer. The question one would ask is that, is the job stress regarded as the problem and why, they believe they have to find another job? Delhi NCR, has emerged as an important economic and industrial hub in India. It is the second-largest producer of cotton in India, due to

which it was known as the 'Manchester of India' along with Kanpur.

Schools in Delhi NCR, Noida, Ghaziabad Faridabad are run either by the municipal corporation, or privately by entities, trusts and corporations. The majority of schools are affiliated with the Government Secondary and Higher Secondary Education Board, although some are affiliated with the Central Board for Secondary Education, Council for the Indian School Certificate Examinations, International Baccalaureate and National Institute of Open School.

1(a) About Education System

High School and higher Education Institutions across various disciplines attract international students mainly from the African countries such as Ethiopia, Zimbabwe, Malawi, South Africa, and Kenya. Education is much more than mere learning. It's a soul searching exercise committed towards excellence. And as challenges have grown over the years the education system has also evolved to stand up to these challenges. School and colleges of Delhi NCR, Noida, Ghaziabad Faridabad encompasses in itself the entire gamut of skills & knowledge required in formulating the guiding principles which helps the students to grow into such individuals who are not only capable of competing with the best but also embodying the values which draw on our best cultural heritage.

Teaching is a noble profession and a teacher work with passion, they are talented, and deal with diverse people who inspire and support them to achieve their goals. Education institutions schools and colleges work in a culture of trust, care, and compassion that have the autonomy to shape of teacher role, and drive their own learning and growth, teaching stress is not a simple function of exposure to these sources of difficulty, but may be modulated by psychological and social resources. Psychological coping refers to the process of appraisal of threat and the mobilization of cognitive and behavioral strategies to manage the problem and its emotional correlates, higher stress perception was associated with 'immature' defensive coping responses. In view of the limited information on this topic, researcher aim is to present the analysis about the relationship between teacher stress and coping responses. We assessed a broad range of problem-focused and emotional-focused responses in order to identify those which might be adaptive and maladaptive with respect to teaching.

2. Review of Literature

Kyriacou & Sutcliffe (1977) have stated that occupational stress consists experiences of unpleasant emotions like anger, tension, anxiety, frustration, irritation, and depression in work front.

This is experienced by women teachers as well. Because of issues in work front and bas well. Because of which they may experience burnout, stress-related problems, mental health problems, and lower work productivity because of which they may consider leaving their jobs or change it.

Though most female teachers consider changing their jobs instead of leaving them (Blix et al, 2006).

There is a tendency among people to think about stress as a negative psychological state including emotional and cognitive components (Cox, Griffiths & González, 2000).

According to study done by Hancock and Weaver (2005), resulted that if a person experiences more stress, then they may exhaust the power to work more and have a high productivity to handle everything and work efficiently.

On the other hand, in a study done by Crum, Salovey & Anchor (2013) have stated that if employees or teacher control their actions and handle the stress they can work effectively and efficiently and manage their job profiles as well as other things.

Over the time, much research has been done on the topic of job stress among female teachers and how they cope up with the stress. One such research states that one cause of job stress and burnout among female teachers is poor working conditions. Burnout can be defined as the response to emotional or frustrated stressors on job or in personal life (Maslach & Leiter, 2007).

Some components which describe the job satisfaction comes to overcome stress of female teachers are social support at work, promotion and development, and workplace bullying.

Leavy (1983) in his study have described social support at work as helping relationships and the quality of those relationships.

On the other hand, in a study done by Bickford (2005), it is stated that social support is a feeling of emotional and practical resources which results from the interactions with family, friends, colleagues, etc. Social support is something which lets a person to work and efficiently and without any stress or frustration which they face when they are working alone and have to manage everything by themselves. This is seen in the case of female teachers.

Promotion and development on a professional front play a very important role as career development for school faculty matters to them and help them in terms of academic position and is associated with their increase in salary (Archibong, Bassey, & Effiom, 2010).

The work stress among female teachers is not only because of the work they are doing or handling professional and personal life together but one factor to this is bullying at the work front.

In a study done by Einarsen & Skogstad (1996), they have stated that bullying is defined as the negative acts or mental harassment happening at workplace. This happens mostly with females at their workplaces. These negative acts or mental harassment can affect a person very badly and the person may experience psychosocial hazards and in severe cases they may try to harm themselves as well

(Rodríguez and Martín, 2017). Apart from all these factors the major thing now that has affected female teachers severely is the pandemic and school shut down, because of which they have to take classes online and no more black board, which makes things difficult for teachers as well as for students. As students as well as teachers had to adapt this online method. On one hand teachers have to manage their classes as well as their home and on the other hand the students have to adapt this new system of online studies and follow a disciplined routine to understand things.

3. Statement of the Problem

Teacher attrition may be a serious issue facing by the schoolteachers nowadays. Stress in teaching profession restrains the quality of the teachers and the same creates a misery in the minds of the teachers due to heavy workload, unsecured state of job, low pay emoluments, lack of career development, lack of communication, harassments in the school or college by peer teachers/workers/students /others, family, and financial problems. Teacher's stress erodes the peacefulness in the mind and life of teachers. It has negative effect on their work performance. What are the sources of job stress to which Delhi NCR, Noida, Ghaziabad Faridabad area teachers are exposed to? How do teachers control the effects of job stress?

4. Need of the Study

The study seeks to find out various sources of job stress that teachers are exposed to and how teachers control the effects of job stress and ways to enjoy their life. Regulations prohibited married women from working; consequently, there was a constant turnover of teachers. Poor pay deterred men from entering the field of education because industrial jobs provided better pay and more status. Factors which are related to an organization and the reasons for the ambiguity among employees are known as organizational stressors. They affect the employees working style and their efficiency. Its outcome may be positive or negative in nature.

5. Objectives of the Study

To Study the work stress among women teachers in Delhi NCR, Noida, Ghaziabad Faridabad area of India.

6. Hypothesis of the Study

H01 There is no substantial difference between the stress of teachers among Delhi NCR, Noida, Ghaziabad Faridabad and the other area India.

7. Research Methodology

Research methodology indicates the logic of development of the process used to generate theory that is procedural framework within which the research is conducted [Remini et al., 1998]. The methodology of this article is to discuss aspects of qualitative research in social sciences and some related subjects in some details. The data were collected to achieve the result for the purpose and scope of this study.

In this study secondary data are used to enrich the article. For the collection of secondary data we have used both published and unpublished data sources. The published data are collected from:

- i) Various publications of foreign governments or of international bodies and their subsidiary organizations,
- ii) Various research reports are prepared by research scholars, universities, economists, etc., in different fields and the unpublished data are collected from many sources.

8. Data Analysis

This study aims find the job stress experienced by the teachers in the state Delhi NCR. In this study, it was found that almost 75% of teachers leave teaching job in first three to five years because of the issues faced at their work front and believing that the profession is incredibly stressful.

More than 53% women teachers start to feel that their job is a stressful profession and demands a lot of efforts because of which they leave the job in first two to five years of their profession to avoid stressful conditions and adverse effects on their health. Women are turning to online education at higher rates than pre-pandemic. The U.S. has 8.6 million registered women learners on Coursera, the very best of all countries globally. In 2020, a

peak of 62% of latest registered U.S. learners were women. While this share is at 52% in 2021, it still represents a big increase from 47% in 2019.

More women are enrolling in STEM courses and entry-level Professional Certificates. In the U.S., the share of overall course enrollments from women increased from 42% in 2019 to 49% in 2021. For STEM courses, the gender gap narrowed from 35% enrollments from women in 2019 to 42% in 2021. Women's enrollments in entry-level Professional Certificates have gone up from 27% in 2019 to 43% in 2021. These certificates, from industry leaders like Google, IBM, and Facebook, are designed to organize learners without a university degree or technology experience for a good range of high-demand digital jobs.

Top skills among Indian women show a balanced investment in human and digital skills. Top 10 skills from the past year include leadership skills, like communication (1.9M enrollments from Asian women), management (1.8M), and entrepreneurship (1.4M). Women also are investing in skills, like probability and statistics (1.6M), programming (1.1M), and theoretical computing (1M). Top courses teach job-relevant and private development skills, including COVID-19 Contact Tracing from Johns Hopkins Bloomberg School of Public Health and therefore the Science of Wellbeing from Yale University.

Businesses, governments, and campuses can play a key role in reducing gender gaps in learning. In 2021 programs where Coursera is employed by various governments and campuses within the U.S., there have been higher shares of girls registered learners (57% and 54% respectively) compared to the U.S. overall (51%). Better gender share is probably going to contribute to more diverse talent pipelines for employers. Among businesses, women now constitute 32% of U.S. learners.

Women learners enroll quite men in courses taught by women instructors. Instructor representation is one among the foremost important factors contributing to increases in women's enrollments. Forty-nine percent of enrollments from women learners are in courses with women instructors, compared to 38% for men learners. the foremost popular women instructors on Coursera include Laurie

Santos (The Science of Wellbeing, Yale University), Seung Hae Kang (First Step Korean, Yonsei University), and Dr. Rosa I. Arriaga (Introduction to User Experience, Georgia Institute of Technology).

Product innovations help grow women's participation in online learning. Factors contributing to enrollment increases from women include adding practice quizzes before challenging assessments (+12% increase in share of lifetime enrollments from women), listing commonest mistakes for peer-reviewed assignments (+16%), and distributing assessments throughout a course (+8%).

Women teachers are using online schooling at a higher rate than they were before the epidemic. Most of the online platform like course area the United States has 8.6 million registered female students (most of them are schoolteachers), the most of any country. Women made up 62 percent of the most recently registered students in the United States in 2020. While this percentage is up from 47 percent in 2019 to 52 percent in 2021, it is still a significant increase.

More women are enrolling in STEM courses and pursuing entry-level positions in science, technology, engineering, and mathematics (STEM) fields.

9. Findings of the Study

The Research has been done on the topic of job stress and job satisfaction among female teachers and how they cope up with the stress. One such research states that one cause of job stress and burnout among female teachers is poor working conditions. Burnout can be defined as the response to emotional or frustrated stressors on job or in personal life (Maslach & Lelter, 2007). Some components which describe the job satisfaction of female teachers are social support at work, promotion and development, and workplace bullying. Leavy (1983) in his study have described social support at work as helping relationships and the quality of those relationships. On the other hand, in a study done by Bickford (2005)

10. Suggestions

Educated teachers are highly satisfied with their jobs and salary as the educated system has been developed over the time which has bought

more opportunities for school faculties because of which the job satisfaction is experienced by them, and the rate of job stress has decreased among them.

According to numerous studies and this document it was seen that the female teachers who are first career teachers experienced job stress whereas teachers who are second career teachers experience low level of job stress. According to previous studies it is resulted that self- efficacy and self-confident plays a significant role in female teacher's job stress as it reduces the level of stress.

11. Conclusion

Though there are promising implications and approaches for further research, the aim of the study was to investigate the level of job stress among female teachers in the Delhi NCR, Noida, Ghaziabad Faridabad Area, with development in the education sector over the time, female teachers now experience a proficient level of job stress. Teachers are having a tough time to adapt with the technology system. Also, it is seen that that the teachers who are starting teaching as the second career, require enthusiasm, self-efficacy, and self-confidence to restart everything. Whereas females who are starting teaching as their first career options experiences job stress initially but over the time they get comfortable. There are many factors resulting in increase of job stress with some solutions to handle it. In some cases, in which female teachers experiences a prominent level of job stress may have negative effects on the mental health of the person and they may leave their jobs to get some peace.

12. Limitation of the Study

Though there are promising implications and approaches for further research, still there are some limitations to this topic. The first limitation refers to the cross-sectional data which does not support any conclusion. A study done by Schwarzer and Hallum (2008) have investigated as the correlation between self-efficacy beliefs and burnout among female teachers. However, this study could not completely reverse a link between self-efficacy and burnout. The second limitation of this study refers to the recruitment of the sample.

Many studies have been conducted to measure the job stress among the female teachers but due to severe workload and busy schedule they could not get time to fill the questionnaire which did had an impact on the results as the actual level of job stress could not be measured.

In a study done by Field (2013) it was stated that the demographic details and the years of experience that a teacher had. But there is no way that we can completely distinguish between the effects of age and years of experience cannot decide the level of job stress among the female teachers.

13. Scope for Further Research

The study reveals that teachers are very much sensitive and dissatisfied with the salary payment compared to other state like Mumbai. Surprisingly, the future scope is to study about stress level of other state teachers also to study about Unbiased and Fair Policies on decision-making in sensitive matters of concern state govt policies for teachers it will increase the level of satisfaction among the teachers.

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COMPUTER SELF EFFICACY AS A DETERMINANT OF EMPLOYABILITY OF MANAGEMENT STUDENTS: AN IN-DEPTH REVIEW

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ABSTRACT

It is being argued that in India the problem today is that of employability rather than that of unemployment. If we have a look at the job opportunities created by Government as well as private sector organizations, we are way ahead of the era where only a handful of potential recruiters used to hire management graduates. Post the liberalization, the number of MNCs entering India is growing year by year. The increase in the purchasing power of Indian households is not only helping the economic growth of the country, it is also generating more career opportunities for fresh graduates as well as the experienced workforce. Specifically talking about the field of management the growth in the sectors like FMCG, BFSI, Telecom, manufacturing and many more has created many job opportunities offering varied and interesting profiles. The start-ups who are backed by funding are also becoming major recruiters for budding talents.

Keywords: unemployment, Basic employability skills, Self-Efficacy

Introduction

However, since last few years various surveys conducted by talent assessment companies have revealed that the employability of the management students has become a matter of concern. As per the India Skills Report for 2014 of Wheebox (An online talent assessment company), only ten per cent of MBA graduates in the country are employable. These results suggest an urgent need to equip the students with education and the desired skills. There are various training organizations and agencies across the country which is offering their services to fill this gap through their skill development programmes but the results of the same are not impressive. The corporate world is complaining that they do not get employees of their choice with the right set of skills and competencies. Most of the organizations which are coming to hire students in B schools in M.P. offering jobs with a service agreement or a bond of a certain period ranging from 6 months to 2 years. The reason behind this is as during the first one or two years of services the organizations incur a lot of cost in hiring, training and developing the employee for the role they are hired for.

If the employee leaves early they not only lose a trained candidate but also have to do this exercise of hiring, training and developing again. In today's world of cut throat competition no organization can afford to lag behind because of its own resources.

Any student, who is equipped to face the challenges of the corporate world or a student

whose skills and interest are not in sink with what the organization requires, becomes a misfit. It not only affects the career of young students it also damages the image of the employer because of attritions. Unemployability of professionals creates further challenges for the economy. Organizations are also experimenting with hiring plain graduates and putting them through rigorous training to ultimately create professionals who meet their requirements. Some of the financial organizations are even launching their own courses and hire students from that pool. It is indeed important for the B-Schools to cultivate market ready students by catering to the dynamic needs of the industries. Students also need to make the use of the technology and all the other resources available to keep abreast with the needs of the organizations.

Psychologist Bandura (1997) has defined self-efficacy as one's belief in one's ability to succeed in specific situations or accomplish a task. Computer self efficacy refers to an individual's judgment of one's capability to use computer (Hsu and Chiu, 2004).Compeau and Higgins, (1995) have further clarified that Computer Self Efficacy thus not refer to simple tasks like entering a formula in a spreadsheet; it incorporates judgments of the ability to apply those skills to broader tasks. Computer self efficacy can further be defined as Task Related Computer Self Efficacy (TCSE) and General Computer self efficacy(GCSE). According to Marakas, et al (1998), TCSE refers to "...an individual's perception of efficacy in

performing specific computer-related tasks within the domain of general computing” whereas GSE can be defined as “...an individual’s judgment of efficacy across multiple computer application domains.”

Employability has been interpreted in many ways ranging from the use of simple measures, such as whether or not a graduate has secured a job, to in-depth scholarly books on the subject. Measuring employability by looking at whether the students have secured a job gives a very vague indication of what the students have gained. Questions should rather be asked about whether the student has the skills, knowledge and understanding gained during his life time and specifically during his management degree course and the ability to use them which makes him capable of meeting the expectations of the recruiters in terms of productivity.

Employability has been defined by various authors in different ways. Yorke and Knight (2002,2007) defined employability as a set of achievements – skills, understandings and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy. Milne (2000) describes as capabilities students develop at university that go beyond content and increase the chances of acquiring and maintaining different types of employment.

2. Review of Literature

2(a) Computer Self Efficacy

Bandura (1986, 1997) concluded that computer self efficacy is derived from the general concept of self efficacy. Gist and Mitchell (1992) suggested that self efficacy is a domain specific, dynamic construct that changes over time as people acquire new information and experiences. Compeau and Higgins (1995) defined computer self efficacy as “...a judgment of one’s ability to use a computer. Venkatesh and Davis (1996) conducted a study with the aim of understanding the acceptance and perceived ease of use of computer and concluded that those who had high computer self efficacy would have a positive perception of information technology. Harrison, Rainer, Hochwarter and Thompson (1997) found that computer self efficacy was related to both an

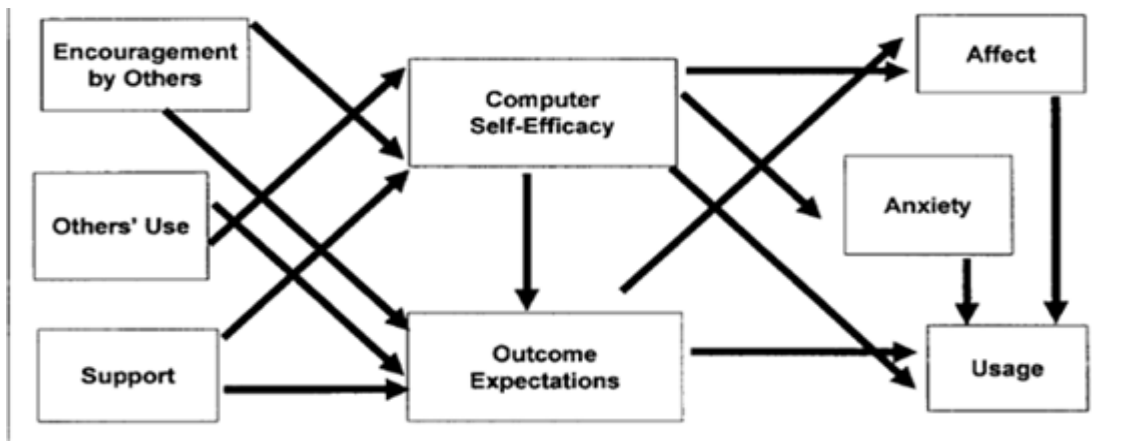
increase in performance success and a positive attitude towards IT. Based on their literature review on computer self efficacy, Marakas et al (1998) developed a Multi Faceted Model of Specific Computer Self Efficacy. They found that the computer self efficacy dynamic, multi faceted and multileveled. Compeau, Higgins and Huff (1999) studied the relationship of computer self efficacy with anxiety, affect, outcome and use behavior. They opined that computer self efficacy increased users’ perception of IT advantages and resulted in more frequent use of technology. Johnson and Marakas (2000) validated the model by Compeau and Higgins with dynamic view. Thatcher and Perrewe (2002) studied how personal innovativeness leads to computer self efficacy and how trait anxiety leads to computer anxiety and concluded that experience decreases computer anxiety and increases computer self efficacy. Hasasn and Ali (2004) concluded that computer and experience had a direct and positive effect on learning performance. Lee (2004) found that owners or manager with higher computer self efficacy were more likely to adopt new technology. Teh et al (2010) concluded that individuals should be trained to increase their advanced-level computer self-efficacy via training programs (e.g., online or face-to-face computer software training programs) so that these individuals would be able to share their knowledge. Chien (2012) found that Learners’ computer self-efficacy has a moderating effect on the relationship between system functionality and training effectiveness. Lower computer self efficacy will lead to a weaker relationship between functionality and effectiveness, and vice versa.

2(b) Employability

Jung (1971) and Myers et al (2003) contended that people’s natural personality preferences cause them to develop habits of behavior and personality patterns that characterize their preferred decision-making and problem-solving processes. A study conducted by Potgieter & Coetzee (2013) to determine the relationship between employees’ employability attributes (as the Employability Attributes Scale measures them) and their personality preferences and significant relationships

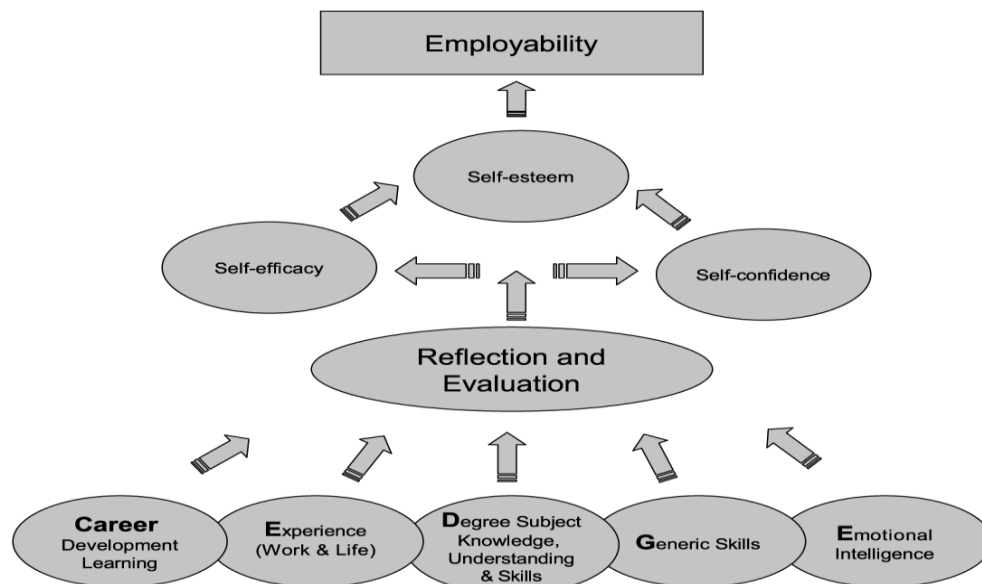
between the participants' personality preferences and their employability attributes was observed by the author. The authors also implied that the human resource managers and career counselors need to recognize how employees' personality preferences influence their employability attributes in the management of their career development and employability. Compeau and Higgins (1995) in their effort to develop a new measure of

computer self efficacy, reviewed the work of Gist et al (1989), Webster and Martocchio (1992, 1993) and Burkhardt and Brass (1990). The authors also tested a model in this study which was developed with reference to Social Cognitive Theory Literature and the existing base of research in the information system literature. The model which was tested is mentioned below-



Source: Computer Self Efficacy Model: Burkhardt and Brass(1990).

Dhar,(2012) conducted a study based on secondary information available on Management Education, perception of the students about the business schools and expectation of the corporate sectors from a management graduate. The author opined that the business schools must be able to change the dimension of learning by its up-to-date course curriculum, innovative teaching pedagogy as well as andragogy in order to contribute positive value addition in the life of the students. Duzer (2006) observed that the education system, with its foundation in nineteenth century structure and a linear pedagogical process, does not have the ability to meet the needs of today's global economy. Ellstrom and Nilsson (2011) have written a conceptual paper with the objective of illuminating the problems that are associated with defining and identifying talent and to discuss the development of talent as a contributor to employability. The authors concluded that Employability is central to employee performance and organizational success. In India, mushrooming of institutes has raised a serious debate on quality (Jagadeesh, 2000). Mahajan *et al* (2013) suggested that many institutes lack focus and clarity in devising and employing measures for quality improvement. Consequently, they fail to make an impact. Nunan (1999) indicated that "employment must be considered in generic terms and fitness for employment must be characterized by generic employability skills. Palety (2009) wrote that not more than 30 institutes in the country have systems and processes in place to deliver quality education. Jain et al (2014) conducted a study on the factors affecting the quality of management education in Madhya Pradesh. The data suggested that due to the liberalization and globalization a need for management graduates was felt so the management institute emerged on a large scale. But due to the lack of quality in management education there is a substantial drop in the admissions in management schools in Madhya Pradesh. Pool and Sewell (2007) developed a model of employability which can help in explaining them the concept of employability easily and to provide a framework to develop the employability of the students-



Source: Pool and Sewell(2007)

Robst (2007) emphasized that more generalist, basic transferable employability skills provided workers the ability to enter the workforce, to perform jobs, to advance careers within a company, and to change jobs within and across industries. Rubin (2009), opined that the curriculum of business management course often fails to provide managerial skill which an MBA graduate is expected to apply in real life problem solving cases.

Rosenberg et al (2011) had conducted a study to examine the basic employability skills needed for job performance, the reception of these skills in college, and the need for additional training in these skills after graduation. The study revealed considerable differences in opinion among the three groups with regard to the skills needed for job performance, the skills received by college graduates, and the additional training needed.

The authors argued that employers historically have not clearly communicated their needs and expectations for the college graduates that they have sought to hire. Individual employability includes general meta-competence and context-bound competence that is related to a specific profession and organization. The concept of employability is wider than that of talent, but the possession of talent is critical to being employable. In this paper, the authors suggest a model in which talent includes individual, institutional, and organizational-social dimensions. Employability is advantageous for present performance on the job as well as for

career and business outcomes (Van der Heijde & Van der Heijden, 2006). Employability presupposes pro-active career behaviours and capacities that help people to fulfill, acquire or create work through the optimal use of both occupation-related and career meta-competencies (Coetzee & Schreuder, 2011; Schreuder & Coetzee, 2011). Employability is a psychosocial construct that represents the career-related attributes that promote adaptive cognition, behaviour and affect, and increase one's suitability for appropriate and sustained employment opportunities (Bezuidenhout, 2011; Fugate et al., 2004; Yorke & Knight, 2007). Choong and Britton (2007) found the Myers-Briggs Type Indicator (MBTI) type preferences to have significant relationships with character strengths and moral values (also called signature or cognitive strengths), like creativity, perspective, love of learning, love (caring) and open-mindedness (flexibility). Natarajan and Kandel (2014) conducted a study among the HR Students of self-financing colleges under Anna University, India, revealed substantial gap between the competencies available with entry level HR aspirants and the expectations of the industries. The authors identified lack of communication skills, lack of industry institute interaction, improper selection of students, lack of competent faculty and outdated curriculum as the most important problems for low employability among students aspiring to take

up career in Human Resources Management. Kulkarni and Chachadi(2014) had conducted a study, focusing IT/ITeS, Engineering Services, and Manufacturing sectors and concluded that, across three industry sectors chosen for this study, Human skills are significantly preferred in making hiring decisions across various types of businesses.

Gap Analysis

P.Prabhvathi(2013), concluded that employability is a key driver in institutional enhancement strategies, which are variously supporting a process of change in four key areas: the integration of employment skills into the academic curriculum; the extension of opportunities for work-related learning; the strengthening of support for skills development through careers education, information and guidance, and academic advisory systems; and the implementation of Professional Development Program. Rao,M.S. (2014) opined that there must be effective coordination among faculty, students, industry and directors of educational institutions for enhancing employability skills among students. It places emphasis on the role of Training and Placement Officer (TPO) in the educational institutions for better employability and calls for promotion of finishing schools to enhance employability.

Today the job market is characterized by rapidly changing demands. Organizations have started relying more on technology to maintain the competitive advantage. The biggest challenge for any employee today is to stay updated and to adapt to the evolving needs of the organization. If we look at the current job market, computer skills are one of the basic requirements for a large number of jobs. Almost all sectors and industries want their employees to be familiar with their functional software. Organizations want their employees to benefit from the leveraging computer technology. As the operational costs are increasing, organizations now prefer to have virtual offices to optimize their functions an. Not only in work profiles related to operations or finance, even in sales profiles the managers

are supposed to be good in number crunching, analyzing the data effectively and using the technology to give the best possible output. In the era of cut throat competition, where information is one of the most vital tools, organizations expect their employees to be well versed with computer and technology.

The students of this generation are expected to have better exposure to and experience of computers as compared to the students of years of past. The reach and availability of low cost internet has increased the usage and penetration of internet. The students today use internet at home, colleges and everywhere on computers and their smart phones. Organizations which come to hire fresh management graduates at management institutes, expect them to be well versed with the technology and especially with the computer and its applications. The management students are expected to do a lot of multi tasking which includes working with complex data, making and analyzing reports, connecting to clients and finding vital information using the internet. The aspirants who are able to match these expectations and are comfortable using the technology, seem to have a slight edge over the others who are not able to do so. For management students, e-commerce has emerged as one of the best recruiters in terms of opportunities and career. With the growth of companies like Flipkart, Amazon, Snapdeal and Paytm many aspirants are looking for careers in this industry which makes computer self efficacy or the possession of skills related to computer a determining factor.

Hence, finding the impact of computer self efficacy of the management graduates and their employability can help the students and the MBA institutes to increase their employability and in turn ensuring a successful career for them.

Conclusion and Suggestions

The literature review on computer self efficacy and employability has given us an insight on the previous work done in respective areas. Because of the nature of work and the demands of the industry it would be beneficial to analyze the computer self efficacy level of management students and to determine whether there are

significant differences among selected demographics. If we can measure the impact of computer self efficacy on the employability of management students then we would be able to take the necessary actions to enhance the overall employability of the management

students by improving their computer self efficacy. If we are able to do so we can even develop a model, highlighting the relationship between computer self efficacy and employability.

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CORRELATION BETWEEN CLINICAL PAIN IN TEMPOROMANDIBULAR DISORDERS AND SIGNAL INTENSITY OF THE RETRODISCAL TISSUE USING FLUID ATTENUATION INVERSION RECOVERY MRI – A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Temporomandibular disorders(TMD) is a broad term referring to pain and dysfunction of temporomandibular joint(TMJ),masticatory muscles and its associated structures. TMD is the most common orofacial pain condition with prominent feature like regional pain in the face and preauricular area during static and dynamic movements. Methods of assessing clinical pain were subjective and not affirmative. There still remains element of drafting the clinical pain evaluation in TMD patients. *Aim:* This study correlated the pain range in TMD patients with the levels of signal intensity(SI) in FLAIR MRI(Fluid Attenuation Inversion Recovery magnetic resonance imaging) to devise a objective pain assessing system based on the SI values. *Settings and design:* The present study is institution based, observational cross sectional study. *Materials and methods:* 32 temporomandibular joints were evaluated in the study. Before imaging, subjective pain score were recorded using Visual Analog Scale(VAS). In FLAIR MRI, both grey matter and retro discal tissue were included in the Region Of Interest and the SIRs were calculated. SIRs in painful temporomandibular joints were correlated with Visual Analog Scale score. *Statistical analysis:* Unpaired t test was used to compare the mean values recorded for SIR. P-value <0.05 is considered to be statistically significant. *Results:* The SIRs of retrodiscal tissue were significantly increased in patient with higher VAS score(p<0.05) *Conclusion:* FLAIR sequences provide increased signal in patients having painful joints with high values in VAS score and it propose that retrodiscal tissue in painful TMJs contains increased proteinous elements.

Keywords – Temporomandibular disorders, Signal intensity, FLAIR MRI, Fluid Attenuation Inversion Recovery Imaging, Retrodiscal tissue, Visual analog scale(VAS)

Introduction

Temporomandibular joint, also known as ginglymodiarthroidal joint, is a complex system which is composed of two joints with articulating ligaments as well as masticatory muscles. It is located between the condylar process of the mandible and temporal bone of the cranium.^[1] The intra- articular joint space is separated by a biconcave articular disc into an upper discotemporal and a lower discomandibular compartments.^[2] TMJ movements are produced by the muscles of mastication and the hyoid bone. Any defect in this complex synovial system known as temporomandibular disorders.^[1]

Temporomandibular disorders (TMD) represents a conglomerate of medical and dental conditions affecting the temporomandibular joints (TMJ) and the adjoining muscles and tissue components.^[3,4]

Literature evidences reveal that TMD is more prevalent between the age of 20 to 40 and shows a higher predilection for women.^[5] It is a multifactorial disorder inclusive of biological, environmental, psychological

factors and also associated with chronic illness and systemic conditions like arthritis, fibromyalgia and certain autoimmune conditions.^[6,7] Clinically, it manifests with discomfort while opening and closing the mouth, may or may not be associated with joint noise and pain. The intensity of the pain could be mild, moderate or severe depending upon the etiological factors.^[8]

The posterior part of the articular disc, known as retrodiscal tissue or meniscus^[9] which is considered highly vascular^[10-15] and well innervated.^[16] Histological evidences prove that retrodiscal tissue exhibits increased vascularity in patients with TMD.^[17] So, it plays a major role in the development of pain related TMJ disorders.^[18,19,20] Fewer studies have compared the diagnostic efficacy of T2 weighed images and FLAIR images and affirmed that FLAIR sequence shows a better diagnostic accuracy compared to T2 weighed images. The supremacy of FLAIR is that it works by both fat and fluid attenuation

The diagnosis of the TMD become complex when the patient reports with the complaint of pain without any systemic illness where they

do not manifest osseous pathologies as well.^[21] MRI plays a pivotal role in assessing the intra articular components of the TMJ, especially the retrodiscal tissue.^[9,22] The diagnostic accuracy was about 73-98% in symptomatic patients, with false positive results of 20-34% in asymptomatic patients.^[23] The changes in soft tissue components of TMJ are well appreciated in T2 weighed images. T2 signal from this tissue is higher in painful joints when compared to the normal ones.^[16]

The microscopic biochemical changes due to TMD will also lead to pain and they are usually unnoticed in proton density and T2 weighed images.^[24] Biochemical changes like higher protein content showed as increased SI in FLAIR sequences. The supremacy of FLAIR over T2 weighed images is that it works by both fat and fluid attenuation. Fluid attenuated inversion recovery (FLAIR) MR sequence has been used widely to diagnose brain lesions and also found useful in differentiating abscess from non-abscess lesions.^[24] In the meantime, some studies have used this sequence to assess the abnormalities of TMJ by evaluating various sites and it has suggested that the signal intensities increased in the painful joints compared to non painful joints.^{[25] [26] [27]} To reduce the rate of false positive results and to improve the accuracy of diagnosis, FLAIR sequence is incorporated in the study.

As the retrodiscal tissue area is considered as the primary site for pain development,^[24] in this study we aimed to evaluate the correlation between the clinical pain range and the amount of increase in the signal intensities in FLAIR MRI in TMD patients. This could also be a reliable tool in assessing intensity of pain in retrodiscal tissue which may help in planning the treatment modality in the future.

Materials And Methods

The study participants were selected from the outpatient department who reported with the chief complaint of pain in the temporomandibular joint region. Patients diagnosed with painful temporomandibular joint disorders based on Research Diagnostic Criteria [Table 6] between the age group of 20 to 50 years were included. The male to female ratio was 5:3. Patients with the history of masticatory muscle disorders, developmental

disorders, claustrophobic individuals, with cardiac pacemakers, implants, history of recent surgery, systemic inflammatory diseases, metallic restorations, pregnant women and patients who are unwilling to participate in the study were excluded from the study. The sample size was calculated using G*power, based on the sample size of the the parent article .keeping alpha error as 0.05and the power(1- β err problem)-0.95, the final sample size was obtained as 32. Patients were selected based on the Research diagnostic criteria. The research study was conducted based on the ethical principles of Helsinki declaration. All the eligible study participants were then selected and well informed about the study and written consent was obtained. The method of the study was accepted by the Institutional Review Board (SRMDC/IRB/2017/MDS/No.901).

Prior to FLAIR MRI, the patients were asked to rate their degree of pain using a Visual Analog Scale (VAS) in which the maximum and minimum scores are 10 and 0 respectively. The degree of pain was recorded separately for the left and right joints. They will be further categorized into two groups:Group A (VAS score below 3) and Group B (VAS score above 3).

The subjects were placed on the table in supine position and Image receiving coils were arranged around the area of interest (grey matter and retro discal tissue). Patients were asked to maintain their anatomical dental occlusion to enhance alignment to the FLAIR MRI. The FLAIR MR imaging parameters was given [Table 1]. Sagittal images of FLAIR sequence were obtained and stored as DICOM files and signal intensities were determined by intact software in the system.

Table 1: MRI imaging parameters

INDEX	FLAIR images
TI/TR/TE/ETL	2500 ms/8000 ms/86 ms
FOV	240*240 mm
Section thickness	3 mm
Slice gap	0.3 mm
Matrix	256*256

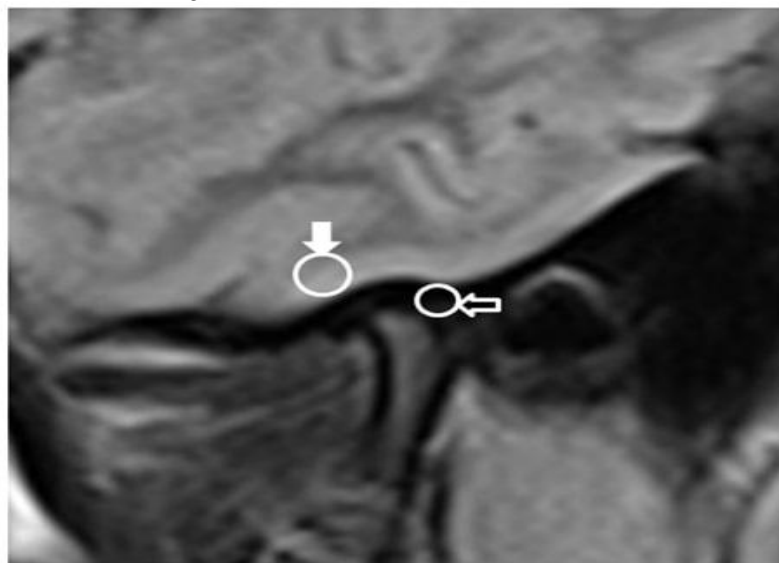
Note : T1, inversion time; TR, repetition time; TE, echo time; ETL, echo train length; FOV, field of view

The signal intensity of Grey matter was considered as reference point. Both GM and retro discal tissue were included in the region of interest. The sizes and position of the ROIs were determined according to the method of Yajima et al.,^[27] For each measurement, a 3 mm square ROI was placed over the retro discal tissue. A 6mm square ROI were drawn over the GM and placed closest to the

mandibular condyle (Figure 1). Measurements of signal intensities in retro discal tissue is performed on FLAIR MRI images by two radiologist with more than 5 years of experience. The signal intensity ratios (SIRs) of retro discal tissue as calculated as follows

$$\text{SIR} = \frac{\text{SIGNAL INTENSITY OF RETRODISCAL TISSUE}}{\text{SIGNAL INTENSITY OF GM}}$$

Figure 1 - Region Of Interest on a FLAIR image in a closed mouth position. ROIs were placed over gray matter (white arrow) and ROIs for retro discal tissue were placed over the area just behind the disk (black arrow).



MRI imaging was done with 1.5 T and the sagittal FLAIR images were compared between the painful and painless TMD joints.

The Normality tests, Kolmogorov-Smirnov and Shapiro-Wilks tests results reveal the study followed normal distribution. Therefore, to analyse the data, parametric test were applied. Unpaired t test was used to compare the mean values recorded for SIR included in the study. To analyse the data SPSS (IBM SPSS Statistics for Windows, Version 26.0, Armonk, NY: IBM Corp. Released 2019) is used. Significance level is fixed as 5% ($\alpha = 0.05$). P-value <0.05 is considered to be statistically significant.

Results

In this study, the population distribution found to be normal. Distribution of the population in the two groups according to age and sex were recorded. The mean age of patients in Group A and Group B were 34 and 33 respectively

[Table 2]. Group A had higher female predilection and Group B had higher male predilection [Table 3]. Signal intensities in retro discal tissue region was measured in both the groups and the signal intensity ratios were calculated. The mean values of the signal intensity ratios in Group A and Group B were 0.9393 and 1.8659 [Table 4]. Group B patients showed increased Signal Intensity Ratios compared with Group A patients which was statistically significant. Therefore, patients with increased VAS score showed statistically significant increase in SIRs in posterior aspect of retro discal tissue [Table 5]. The mean difference between the two groups assessed by unpaired T test. In this, patients with increased VAS score showed statistically significant (p value = .006; Degree of freedom = 31) increase in SIRs in posterior aspect of retro discal tissue [Table 5], [Graph 1].

Table 2: Age distribution among the study groups

Age distribution (in years)	Group A (VAS UPTO 3)	Group B (VAS ABOVE 3)
21-30	41.1%	40%
31-40	17.6%	33.3%
41-50	41.3%	26.7%
Mean	34.7	33.8
Standard deviation	2.57	2.34

Table 3: Gender distribution among the study groups

Gender distribution	Group A (VAS UPTO 3)	Group B (VAS ABOVE 3)
Male	47%	66.6%
Female	53%	33.4%

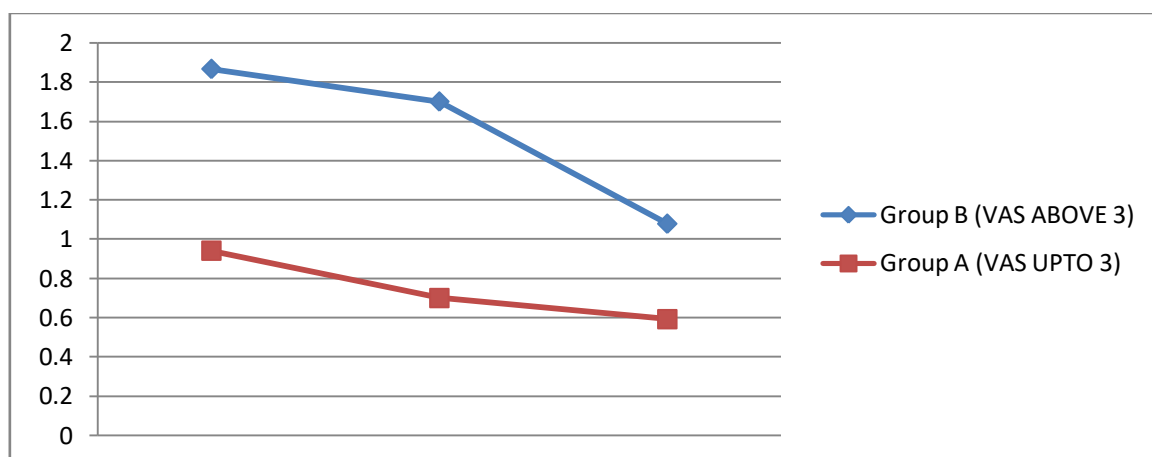
Table 4: Descriptive statistics of the groups included in the study

Variable	Group A (VAS UPTO 3)	Group B (VAS ABOVE 3)
Mean	.9393	1.8659
Std. Error of Mean	.15292	.26154
Median	.7000	1.7000
Std. Deviation	.59227	1.07834
Variance	.351	1.163

Table 5: Comparison of mean difference of SIR between the study groups

	Variable				T	df	P-value	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower				Upper
Group A-Group B	-.03719	1.30869	.23135	-.50902	.43465	.161	31	.006

Graph 1- Comparison of Mean, median and standard deviation difference of SIR between the study group



Discussion

In this study, the study participants with a VAS score below 3 were categorized as group A and those above 3 as group B. The VAS scoring

system is a subjective pain rating scale, introduced in the year 1921 by Hayes and Patterson.^[28] Based on the age, the study participants were grouped as 21-30 years, 31-40 years and 41-50 years. In Group A, 41.1%

of the participants were between the age range of 21 -30, 17.6% of the participants were between the age range of 31-40 and 41.3% of the participants were between the age range of 41-50. In group B, 40% of the participants were between the age range of 21-30, 33.3% of the study participants were between the age range of 31-40 and 26.7% of the study participants were between the age range of 41-50. The participants between the age of 21-30 years showed a higher VAS score compared to other two groups and the least score was noted in the participants in the age group of 31- 40. Considering the gender distribution among the 2 groups, group A had a higher percentage of females (53%) and group B had a higher percentage of males (66.6%).

Our study was directed to assess and to evaluate the correlation between the level of pain in temporomandibular disorder patients with the amount of increase in the signal intensity in FLAIR MRI. This is the first study carried out in the Indian population to analyse FLAIR MRI relation with TMD patient's clinical pain score. Participants within the age group of 20 to 50 years who were diagnosed as having TMD based on TMD RDC criteria 2014 regulated by American Association of Orofacial Pain were enlisted in the study. The TMD Research Diagnostic criteria, first presented by Dworkin and LeResche in the year 1992,^[29,30] was appraised as the most reliable and valuable etiology based diagnostic tool for clinical evaluation of TMD patients.

Kenichu Imoto et al(2011),conducted a study to compare the potential of fluid inversion recovery imaging with T2 weighed imaging in patients joint effusion. In this, FLAIR sequences revealed joint effusion containing presence of protein elements.^[31] In the year 2013, Hitoshi hanyuda et al, clarified the presence of minimal amount of fluid in the temporomandibular disorder patients using FLAIR sequence and proposed that minimal fluid may contain proteinaceous elements that has the capacity to shorten T1 relaxation time in magnetic resonance images.^[32] Following the next year, Sayaka kodama et al demonstrated that there is a relationship between the condylar bone marrow abnormalities in FLAIR images and the TMJ pain. This study also emphasized the advantage

of FLAIR MRI over proton density weighed images and T2 weighed images.^[24]

Migiwa kuroda et al (2015), revealed that there is significant increase in FLAIR MRI signal intensities in the retrodiscal tissue region in painful TMD patients. Also, this study underlined that the retrodiscal tissue in painful temporomandibular patients contains proteinaceous elements.^[24] This same author after 2 years conducted a study and suggested that there is increase in signal intensity ratios in FLAIR MRI in the lateral pterygoid muscles in painful TMD patients.^[26] Mika otonari – yamamoto et al (2017)emphasized that the FLAIR signal intensities can be influenced by the protein elements in joint effusion. Hence, it was concluded that diagnostic sensitivity is more in FLAIR images than T2 weighed images.^[25]

Literature evidences quote the presence of elevated protein levels in painful TMD. These contents have the ability to shorten T1 relaxation time and is represented by an increased signal intensity in the FLAIR image. Some studies suggested that the retrodiscal tissue could be the origin of pain in temporomandibular disorders.^[33] Therefore, retrodiscal tissue was considered as the region of interest in our study.

The mean difference of the Signal Intensity Ratios in the retrodiscal region were compared between group A and Group B. The mean difference is -.03719 and the standard deviation is 1.30869. It showed statistically significant differences (p value = 0.06). The higher values were noted among the study participants in Group B. The result of our study stated that there is increase in SIRs in TMD patients with higher clinical pain score. The results of our study is consistent with previous FLAIR MRI based studies.

This present study concludes that there is a significant correlation between the FLAIR MR signal intensity ratios and the clinical pain score. All the previous studies which have used FLAIR MRI to evaluate temporomandibular disorder symptoms were based on Japanese population. This is the first study done in the Indian population to evaluate the diagnostic efficacy of FLAIR MRI and its correlation with clinical TMD symptoms. From our study we observed that FLAIR MR images of retrodiscal

tissue region could be helpful to objectify TMJ pain in the temporomandibular disorder patients.

The limitations of this study are smaller sample size and Visual Analog Scale is a subjective pain measuring tool so that this study required to be done with more efficient pain measuring method to objectify clinical TMD pain. In this study, we have performed

MRI with 1.5 tesla and for improved sensitivity and specificity of the results and to formulate a diagnostic criteria, this study needed to be performed with MRI with 3.0 tesla.

Further multicentre studies with large sample size are needed to formulate a standard diagnostic criteria to evaluate TMJ pain in MR images.

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Histologic features of the temporomandibular joint disk and posterior disk attachment: comparison of symptom-free persons with normally positioned disk and patients with internal derangement. *Oral Surg Oral Med Oral Pathol*. 1989;67:635-43

EARNING A DEGREE ONLINE DURING CORONA VIRUS TIME FRAME: A REALITY CHECK FROM STUDENT'S PERSPECTIVE**S. Umarao¹ and I.A. Shamsi²**^{1,2}Department of Journalism & Mass Communication, University of Allahabad, Prayagraj, UP, India
²intikhab.falahi@gmail.com**ABSTRACT**

The suspension of educational activities in India in response to the COVID-19 pandemic led to an unanticipated shift from conventional learning to digital learning. The purpose of the study is to ascertain the attitudes of Indian university students toward mandatory online courses during the Corona virus time span. After interviewing undergraduate and postgraduate students, it was discovered that sudden shift from offline to online learning failed to provide the desired results in countries like India because of technological and financial constraints that prevented most students from accessing the internet. Several additional concerns raised by higher education students were the instructor's lack of face-to-face contact, response time, and the absence of conventional classroom socialization.

Keywords: COVID-19, Online learning, Higher Education, Online Learning COVID 19, Remote Learning, Student's Perspective

Introduction

COVID-19 was declared a global public health emergency of international concern on January 30, 2020, and a pandemic on March 11, 2020 by the World Health Organization (WHO) (Cucinotta & Vanelli, 2020). India's first incidence of COVID-19 infection was recorded in Kerala on January 27, 2020 (Andrews et al., 2020) and on June 19, the Capital recorded 3,137 Covid-19 positive cases, bringing the total number to 53,116, according to a Delhi government health advisory (Coronavirus India Lockdown Day 87 Updates | June 19, 2020 - The Hindu, n.d.). As the COVID-19 pandemic refuses to die down and the caseload was on an upward trend, several states and Union Territories in the country had shut schools and colleges in March 2020 and the government immediately advised moving to "online education" (From Karnataka to Delhi: Schools, Colleges Shut across India as COVID-19 Cases Surge - Full List Here, n.d.).

At this stage, making a shift from a conventional educational setting to a remote and virtual learning environment effectively is not something that can be accomplished overnight. At this point, this fast change is associated with a variety of barriers and problems (Crawford et al., 2020). However, since no one can predict when the epidemic will be completely eradicated, educational institutions across the nation have chosen to make advantage of the already existing technological resources to develop online

learning materials for students across all academic disciplines. Additionally, Covid-19 forced academic professionals to reevaluate and explore remote learning as a potential alternative for filling classrooms, thereby decreasing student infection risks while waiting to resume conventional activities.

Many institutions offered online courses, but there are two concerns that should be addressed before enrolling in Courses Available Online. The first is that there is little evidence of the effects and efficacy of online education from a broad macro viewpoint (McPherson & Bacow, 2015). Second, our capacity to successfully teach digitally may vary considerably based on the wide range of learning goals that guide our instructional and educational priorities (Liguori, 2020).

The unanticipated shift to online learning became a barometer of organizational agility (Wu Zhaohui, n.d.), with many academic institutions focusing mainly on the transfer of educational material to the digital realm rather than on online teaching and delivery techniques in particular (Shamsi, 2020). Nonetheless, it served as a reminder of the scarcity of resources in academic institutions as well as the social marginalization of students, where insufficient access to and availability of the internet, as well as a lack of the most up-to-date technology, hindered organizational responsiveness and students' ability to participate in digital learning activities (Zhong, n.d.). Another important component of

traditional classroom interaction is absent from online learning. In a digital learning environment, students only connect with each other digitally and never interact with one another in person, resulting in a lack of real-time exchange of ideas, knowledge, and information amongst students (7 Missing Pieces: Why Students Prefer in-Person over Online Classes | University Affairs, n.d.).

The present scenario is unusual; rather than typical digital learning settings, as some may argue, it is more properly described as crisis learning in the current context (Pace et al., 2020). For academic institutions, there is a greater need to enhance their curriculum, and the use of innovative teaching techniques and tactics should be given the highest level of priority (Toquero, 2020). Educational institutions are also hubs for social activities and interactions, and they serve as meeting places for students (7 Missing Pieces: Why Students Prefer in-Person over Online Classes | University Affairs, n.d.). A significant number of children and young people would lose out on social interaction-based activities that are essential for development and learning if face to face educational activities are stopped. Students, especially impoverished children and young people, should be allowed to complete their education. Because school suspension has a negative effect on both of these groups, this is a major problem that has to be addressed. The closure of academic institutions for a short period of time as a result of crises is not new, but the worldwide breadth and speed of current-day educational instability are unprecedented, and if it continues, it will cause psychological anguish and suffering at all levels of society (McCarthy, n.d.).

The adoption of information and communications technology (ICT) is unavoidable in higher education (Dahiya, 2018); but in present scenario as a result of the unavailability of learning and administration systems, the vast majority of educational institutions were obliged to stop their online courses for a short period of time. Only a handful of the country's top-ranked institutions were able to begin offering online courses as soon as the semester began (Dhawan, 2020).

The majority of India-based research on the challenges and opportunities associated with e-

learning adoption has been conducted in a usual situation and context, in which e-learning was an optional method for enhancing the learning and teaching cycle and interactive technology, was used by only a few national academic institutions. Several previous Indian academic researchers have also shown positive results of remote learning. Researchers found that, similar to traditional learning, distant education provides acceptable contact between instructors and learners if the material is well-designed and current, and the teachers are dedicated and trained with the necessary skills and expertise. While, the current scenario is diametrically opposed to traditional distant learning programmes, since all higher education institutions in India are compelled to adopt distance learning methods despite their limited resources and funding (Dhawan, 2020).

A few recent research examined the challenges and opportunities associated with utilizing e-learning during pandemics (Mailizar et al., 2020). The researchers are examining the advantages and challenges of existing e-learning initiatives from the viewpoints of many stakeholders. According to researchers students' opinions on this issue are critical; therefore, future research should examine students' perspectives on online learning in order to assess the challenges that students face. Additional research is needed to determine the challenges connected with e-learning that may be limiting students' ability to meet their learning goals. Experts suggested that future research studies examine the quality of online learning.

The Aim

The following are the objectives of this study:

- (1) To ascertain the efficacy of online learning in India from the viewpoint of higher education students.
- (2) To draw attention to the difficulties and barriers that higher education students in India experience while engaging in online learning.

Method

Sample

The primary goal of this research study was to determine the overall views of Indian higher education students regarding mandatory digital and remote learning university courses in the

context of the Corona virus outbreak in the country (COVID-19). 137 higher education students were involved in the study, with 48 females and 89 males taking part in the research. Students from both undergraduate and postgraduate programmes participated in the study, with undergraduate students accounting for 50.8 percent of the total. All of the students who took part in the survey were currently attending online classes or included those who finished their last semester virtually.

Survey

The data on the views of Indian higher education students about online learning was gathered via the use of an online survey method. The efficacy of online learning was evaluated using a questionnaire developed by Bernard, Brauer, Abrami, and Surkes (2004) that was adapted for this purpose. Students from various departments in Patna University, Maulana Mazharul Haque Arabic and Persian University, and Patliputra University at Patna participated in a pilot test of the survey. Their opinions and recommendations were taken into consideration, and appropriate changes were made. On the basis of their suggestions and comments, the necessary changes were implemented.

Data Analysis

The information gathered via an online survey was evaluated based on the frequency of answers from common pupils, and the results were expressed as percentages. The demographic information was gathered using a Likert scale, and the results are shown as a percentage of the total number of students who responded.

Results

Undergraduate students accounted for 51 percent (n = 70) of the study sample, while postgraduate students accounted for 49.9 percent (n = 67). Of the total 137 pupils, 12.4 percent (n = 17) were between the ages of 16 and 22, and 87.59 percent (n = 120) were between the ages of 23 and 30.

73 percent (n = 100) of respondents stated that they have adequate internet access, only 9.5 (n = 13) percent claimed that they do not have

proper internet connection, and 17.5 percent (n = 24) reported that they have restricted internet access.

As shown in Table 1, 49.63 percent of students believe that signal availability and strength are the most significant problems preventing them from having regular online connectivity, 4.37 percent believe that internet services are too expensive for regular online connectivity, and 34.30 percent believe that there are other factors contributing to limited internet access.

When asked whether they believe they are competent to use a computer or laptop for online learning, 67.15 percent of students believe they are very well equipped to use a computer or laptop for online learning. Students stated that they are proficient net communication 58.39 percent of the time, while 13.13 percent reported that they have difficulty communicating digitally.

64.23 percent of those who answered the question about whether online and conventional learning are identical said that online learning is significantly different from traditional learning mode, while 15.32 percent said that there is no difference between the two modes of learning.

A mere 12.40 percent of students believe that Learning online more engaging than face to face classroom setting, while the vast majority of students (67.88 percent) believe that online learning is less motivating than conventional learning.

When asked about using digital tools for group projects and assignments is simple, 18.97 percent of higher education students responded that it is easy to digital tools for group projects, while 49.63 percent believed it difficult

In a survey, 42.33 percent of students said they had difficulty completing group projects or assignments via distance education, while 42.33 percent of students said they believed group projects and assignments could be done digitally.

When asked about the efficacy of face-to-face interaction, 75.18 percent of students said that they believe face-to-face contact with an instructor is essential for both classroom and remote learning.

Students' Responses Toward Online Learning

Responses	No.	(%)
The primary reason for restricted Net access		
Expensive/High Cost	6	4.37
Issues with signal availability/strength	68	49.63
Having trouble using it	16	11.67
Other	47	34.30
Competent to use a computer/laptop.		
Yes	92	67.15
Somewhat	35	25.54
No	10	7.29
Proficient in net communication.		
Yes	80	58.39
Somewhat	39	28.46
No	18	13.13
Face to face and online both methods of instruction are identical		
Agree	21	15.32
Somewhat Agree	28	20.43
Disagree	88	64.23
Learning online more engaging than face to face classroom setting.		
Agree	17	12.40
Somewhat Agree	27	19.70
Disagree	93	67.88
Using digital tools for group projects and assignments is simple.		
Agree	26	18.97
Somewhat Agree	43	31.38
Disagree	68	49.63
Digitally completing group projects/assignments is simple.		
Agree	46	33.57
Somewhat Agree	33	24.08
Disagree	58	42.33
Learning requires direct interaction with the teacher.		
Agree	103	75.18
Somewhat Agree	20	14.59
Disagree	14	10.21
*Percentages based on the number of respondents answering the question.		

Table1. The survey's findings are summarized**Discussion**

The majority of higher education students who responded to the poll expressed skepticism regarding online/digital learning. Among the most significant difficulties encountered by higher education students in India were limited access to online resources, a lack of appropriate engagement and interaction with other students and teachers, as well as inefficient technology. Students' learning experiences have been radically transformed as a consequence of the abrupt move away from conventional classrooms and face-to-face instruction toward online instruction. The majority of students do not have access to high-speed internet connections, and as a result, they struggle to succeed in online courses.

The fact that only a small number of educational institutions were able to offer

successful online courses during the first few months of COVID-19 may be attributed to the inadequate resources available to them. In addition, the research revealed that students experience additional difficulties such as a lack of campus socialization, difficulties with group study, and response time from professors. Survey participants also said that conventional classroom learning was more successful than online learning or distant education when compared to these other options.

One of the less mentioned aspects of online education is the need of motivation for students to participate in online courses. Students in conventional courses are more likely to actively participate in academic activities as a result of their face-to-face interaction with the teacher and other students in the class. Seventy-one percent of students said they found studying in

a traditional classroom to be more inspiring than learning via remote learning. As stated by the majority of students, they can organize their study time efficiently online and can easily finish assignments on time.

A successful and productive online programme requires students to not only be able to deal with the fast-paced nature of online courses, but they must also possess strong computer and technical abilities in order to benefit from the lectures delivered over the internet. The ability to manage study time effectively is present for such students, and they do not encounter any difficulties; however, when it comes to completing group assignments without having a face to face meeting or discussion with the group members, they encounter numerous difficulties, as indicated by 42.33 percent of respondents.

Concluding Remarks

There are a variety of technologies accessible for online education, but they may sometimes cause a slew of complications. These challenges and concerns connected with contemporary technology vary from downloading failures to installation issues, login issues, and audio and video problems, among others. Occasionally, students find online instruction to be tedious and uninteresting. Online education requires so much time and flexibility that students never have enough time to complete it. Personal attention is another significant problem confronting online education. Students want two-way communication, which may be challenging to accomplish at times. The learning process cannot be fully realised unless pupils apply what they have learned. Occasionally, online material is entirely theoretical and does not provide opportunities for students to practise and learn successfully. Course material is also a significant concern. Students believe that the absence of a sense of community, technological challenges, and difficulty comprehending educational objectives are the primary obstacles to online learning (Song et al., 2004). Students were found to be unprepared for combining their job, family, and social life with their academic lives in an online learning environment, according to a research. Additionally, students were found to be underprepared for a variety of e-learning and

academic-type skills. Additionally, there is a lack of preparation on the part of students regarding the use of Learning Management Systems (Parkes et al., 2014).

In academic institutions all around the globe, COVID-19 had impacted the traditional learning methods they used. To provide students with an alternate method of resuming their education, school, college, and university administrations have turned to online lectures and courses. Although online learning is proven to be beneficial in protecting students' and faculty's health in the face of the COVID-19 epidemic, it is not as successful as traditional learning in this situation. Sudden Transition of online learning does not provide the intended effects in impoverished nations such as India, where the overwhelming majority of students are unable to use the internet owing to technical and monetary constraints that prevent them from connecting. It was the purpose of this research to compare the efficacy of online courses with conventional classes, particularly for those pursuing higher education.

The absence of conventional classroom socialization and contact, as well as a lack of interaction with the teacher, were among the other problems students identified in addition to technical and monetary difficulties, according to the survey. The findings of this research also suggested that educational institutions should enhance their curriculum and provide material that is suitable for online lectures in order to succeed. As directed by the World Health Organization, we must now adjust our daily activities to accommodate COVID-19 for at least a short period of time. This means that educational institutions must develop appropriate and effective content, implement an effective delivery system, and provide digital literacy training to their current faculty in order to achieve better learning outcomes.

Limitations

One of the most significant disadvantages of this research study was the small sample size and non-random selection of participants. Because of the non-random selection process, the findings cannot be generalized in any way. Future studies should either expand the sample size or use random selection methods to ensure a representative sample. In light of the fact that

the findings are based only on students' views, including faculty perspectives in future research may aid in better understanding the difficulties that instructors confront when it comes to online education. In addition findings are based on the views of students at high ranked institutions in India, the examining the perspectives of students at lower-ranked universities who had less access to the most

recent digital technology, will produce more critical findings.

Conflict of Interests Disclosure Statement

The research, writing, and/or publishing of this paper did not result in any possible conflicts of interest on the part of the author(s) or their institutions.

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INDIAN EDUCATION: POLICIES, REFORMS, IMPLICATIONS AND FUTURE PROSPECTS- AN OVERVIEW

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ABSTRACT

The present article discusses the path of implementation of National Education Policy 2020, suggesting the Four –P Approach: Public, Private, Partnership and Philanthropy along with financial concern for Education, Involvement of stakeholders, Quality research and teaching. The authors advocate National Education Policy 2020, recognizes “Education is the single greatest tool for achieving social justice and equality.” This policy has vision to create vibrant knowledge society by providing quality education to all and thereby making India a global knowledge super power. This is also to develop deep sense of respect towards the Fundamental Duties and Constitutional values of our country.

Keywords: Indian Education, National Education Policy 2020, Higher Educational Institutions, Policy Implementation

1. Introduction

The Constitution of India (26 November, 1949) clearly states in the Preamble that everyone has the right to equality of status opportunity, justice & equity. The Article 41 of the Directive Principles of the Indian Constitution supports the right to work, education and public assistance in certain cases including disablement. After 73 years of implementation of Constitution, if we look at the status of Conservation of Constitutional provision, it reflects mismatch. However the system of higher education has witnessed tremendous expansion and transformation. Several committee recommendations and policies have tried to shape the education system in independent India like New Education Policy 1986, POA, 1992. Knowledge Commission 2008, Prof Yashpal Committee Report 2005, the Educational Tribunals Bill, 2010, the National Academic Depository Bill, 2011. The National Accreditation Regulatory Authority for Higher Educational Institutions Bill, 2010. Rashtriya Uchhatar Shiksha Abhiyan (RUSA) 2013. Unfortunately these recommendations and policies have not been implemented to the extent as to which they are required. If we have still not succeeded in enforcing the previous recommendations and suggestions properly then what is the assurance that the new policy will be implemented better than the previous one. These question still remains with new Indian Education policy, however the determination of present Government of India spread positive hope to achieve the desired job.

Practically this is not possible as genuinely nobody can guarantee the overall success of any policy implementation.

2. Scope and Significance of Study

The challenges at ground level of our education system reminds us of the previous inefficiencies and failures. As compared to western countries, we have to travel a long way to revive our glorious system of ancient education system and cope with the own new challenges of 21st century. We should remember the recommendations of knowledge commission and Prof Yashpal Committee report in UPA 2 government for transformation of higher education. At that time Mr. Kapil Sibbal, the then, HRD minister promised that all the recommendations given by knowledge commission and Prof Yashpal will be implemented within 100 days. But nothing such happened. As per the recommendations of knowledge commission, 4000 universities would have to be established for enhancing GER and access to higher education, which is still to seek. There's a lot of difference between the verbal and the action mode of the governments in power. And not only this, there's no one seem to be liable, to be questionable, to be sincere enough to accept the failure of the policies and the recommendations. The hope of future blurred out in every governance. Without considering the past experiences give strength to policy makers to sketch the rosy picture. Numerous seminars, webinars, panel discussions through online & offline mode have been organized

like flood on national education policy 2020 but very few have laid emphasis on the actual implementation of national education policy. Are we will organized such type of webinar, conference and discussion on the extent of implementation of national education policy when the policy will be in its full operational mode. And question will ask from the concerned. Definitely not. Do we have right to ask question why policy is not implemented as mentioned in the document? Who will be accountable? I would like to quote a line of Ramcharitmanas written by Tulsidas, "Sachiv Guru Vaidya teen jo Priya Bole BhayaAas Raj Dharm Tan teen KarHoiniyeBegahiyaNaash." The above quote denotes that if the minister, the doctor, and the teachers speak false in fear of punishment or for selfish motive before the king (government) then they destroy and demolish the nation, the health and the knowledge respectively. But if they conduct their Dharmas (duty) truly they all can play a major role in upliftment and progress of a nation. Here the statement of our honorable Minister of Education that the 90% of research not fit into the quality parameter, lack of particular skill in our trained youth. So many questions raised by the society in public domain regarding competency and qualification of our educational administrator often we read in newspaper. The question is who will take responsibility? Why ministry not taking action in order to improve the quality of research. We should think over it.

3. Review of Literature

The basic purpose of Higher Education is to create knowledge, wisdom, and innovation. Conduct good quality research for raising the standard of life. Creswell (2012) states that "Research is important for three reasons" which he classifies as: Research adds to our knowledge, Research improves practice and Research informs Policy Debate (p. 3). So, an ideal research must be the one which could either create some new piece of knowledge which can be utilized by the society, or it must be giving a new perspective or analyze any ongoing policy to overcome its flaws. These are all well-established purposes of research throughout the research community.

Education is the collective responsibility of all the stakeholders including government, educational institutions, teachers, parents, students and policy makers too. Whenever we discuss about transformation of higher Education, focus is laid on some significant points, firstly, whether all the stakeholders concerned with higher education are competent enough to cope up the transformation? Stakeholders to be mainly considered are teachers, students, educational administrator. Secondly, what is the real objective of higher education? The answer can be, the basic objective of higher education is to construct knowledge, conduct quality research and innovation and to spread ideological consciousness. If we chase to achieve goal of higher education we will face a lot of challenges. We need to identify the shortcoming the root cause as well as the way to go ahead. The new education policy 2020 mentions this obstacle very effectively at page number 34 point 9.2 to 9.3. When we talk about the status of higher education in the light of objective of higher education. The first one is the actual status of creation of knowledge and the question where we stand in the world in this regard. With respect to creation of knowledge the second objective of higher education is research and innovation. If we see the indicator of research and innovation the citation index, copy right, workforce student's teacher ratio, file patent, utilization and dissemination of research findings.

If we describe National Education Policy 2020 in very short then my answer would be, it is a wonderful draft for transformation of higher education, nicely highlighting the problems of higher education but the terms used in the policy create doubt, there's lack of scientific terminology and operational nature which creates ambiguity.

- **Case-1.** Revamp the higher education system, create world class multidisciplinary higher education institutions across the country, Quality Universities & College - , increase GER to at least 50% by 2030.

Concern: What would be the indicator of Quality Universities and College? What actually is meant by create world class multidisciplinary higher education institutions? This needs clarity. Increase GER to at least 50%

by 2030. No details about the ratio of population eligible for enrollment? For this how many institutions shall be required? What will be the teacher and students ratio? How many teachers are required as per the GER 50% what % of posts are presently vacant in Higher Education Institution and what shall be the deadline for filling the vacant post.

Second part of the document from page number 34 to 52 is focusing on to the transformation of higher education. At page number 62 the document itself states that the policy would be successful if it is implemented as per the implementation plan. The effective and authentic implementation of the policy depends upon the various factors and interventions from the part of the stakeholders and the governance. Policy document page 63 point 27.1 stated that coordination, decentralization across all the stakeholder is a necessary requirement for better implementation. The document also mentions about some principles regarding implementation of policy like spirit and intent, incentive and priority and monitoring, timely infusion of required resources. No doubt the document devoted to transform Indian Higher Education in the light of Indian tradition of knowledge, conservation of constitutional value. NEP states that the GER will be 50% by 2030. One higher education institution shall be established in every district. National research foundation will be established for quality research and required funding. There in Multidisciplinary College and autonomous college will be strengthened.

• **Converting Dream into Reality**

The successful implementation of National Education Policy 2020 requires different types of interventions and role of transformation. It requires devotion, dedication, determination, commitment, coordination and cooperation between various stakeholders and most importantly political commitment. The National Education Policy 2020 shall be definitely transform the Indian Higher Education provided the stakeholders at all the levels of education should be dedicated, committed, honest and accountable. If we are to be pathos about implementing National

Education Policy 2020, we should steel means, methods and implementation rule of procedure. Policy failure or success depend upon the governance, political interference, basic infrastructure and the filling the gap between policymaker and end user practitioner. The Prime Minister has highlighted to build healthy relation and coordination with collective consciousness for implementing the National Education Policy 2020. The implementation of policy will not be depended on sole of the intervention it will depend upon factuality. For enhancing factuality we have to focus on attitude change, skill orientation, knowledge creation and research culture.

As per the Document policy will be implemented in phase manner p- 63 and a Central Advisory Board of Education (CABE) will be strength for developing, articulating, evaluating, and revising the vision of education Ministry of Human Resource Development (MHRD) be re-designated as the Ministry of Education (MoE). 'Light but tight' regulatory approach (NEP 2020; 39-40).

4. Discussion and Analysis

India will be promoted as a global study destination and high-quality foreign institutions among the top 100 in the world will be facilitated to operate in India. The promise for world-class teaching and research institutions needs to be collaborated with the NEP implementation plan, and require more flexibility, autonomy and world class infrastructure. For example we can take a pilot study and compare to existing various indicator of world class institute required to quality faculty, internationalization, promote research ecosystem, interdisciplinary, importance of technology, industry partnership, emphasis on internship carrier and placement. Student -teacher ratio is one of them. Let's have a look, table -1 regarding student-teacher ratio. Are we competent enough to create various indicator of world class institute? Answer probably not positive, then we should think in order to create above mentioned indicator for effective implementation of provisions mentioned.

Table- 1: Student Teacher Ratio in Ancient Indian University & World Class University

S.N.	World Top 5 Institute *	Teachers Students Ratio	Indian Ancient University**	Teachers Students Ratio
1	Massachusetts Institute of Technology	3:1	Nalanda University	5:1
2	Stanford University	5:1	Takshsila University	5:1
3	Harvard University	17:1	SharadaPeeth,	Data Not Available
4	California Institute of Technology	3:1	Vallabhavi University	10:1
5	University of Oxford	22:1	Vikramshila University	3:1

Source *Data Collected From concern University Website. ** Data Collected From different Website source.

Indian Education Policy 2020 also raised various issue regarding above mentioned indicators along with the students teacher ratio and stated that the student's teacher ratio will not be so high. Now here, what is actually meant by high and low? Policy must be clear about the student teacher ratio, while preparing the implementation plan as per the requirements for quality research and teaching.

- **Political will:** For effective implementation of NEP the strong political will be required. Our honorable prime minister has given the assurance in his speech that they are bound to implement National Education Policy in time bound manner but the real challenge is for the teachers and their coordination and dedication.

- **Involvement of stakeholders:** Research findings lead to policy framing and policy debate, similarly research finding is applicable to real practitioners. Many research and their findings supported that there is a gap between policy maker and practitioner, researcher and end users, teacher and students, social worker and society member, concern audience, educational research and educational practice, Educational researcher often complaint that the finding of researches are not used by the educational practitioner, Educational practitioner complain that the finding of research is not as per the requirement of stakeholder. In this connection we as a teacher, educational administrator and those who are imparting and operating educational institution should and must build a faithful relationship. National Education Policy 20-20 has vision to conserve Indian wisdom. We should move forward in this direction whole heartedly with honesty and accountability.

We should be united for the national development and for bridging the gap in order to enhance coordination, cooperation between various stakeholders. Definitely this will lead to proper policy implementation, knowledge translation and dissemination.

- **Legal document:** National Education Policy, only a 67 pages document, which is approved by the cabinet on 29th of July. For its effective implementation it must be a legal document through constitutional amendment in the name "National Education Policy Act 2020". This ensures that the violation of provisions mentioned in this document lead to legal punishment. Violation of policy is treated as a crime and any members of the society can file complain regarding non implementation of the policy provisions. Every year an evaluatory report on extent of implementation must be presented in public domain. A debate should be organized for achieved and still to be achieved provisions, the problems while implementing the National Education Policy to till date. Reports should also be presented in parliament as well as State assembly in which the member of public representative raise the issue regarding the challenges of implementation of national education policy. For example again we can see status of implementation of right to education act 2009 as per their provision. According to fourth survey of Ministry of Human resource development the provision of right to education act 2009 has not been fully implemented even the basic infrastructure could not be provide in order to create inclusive learning environment . Why government official not taking action against concern?The implementation of national

education policy depend upon the positive mindset of the government.

- **Financial concern for Education:** Arrangement of the finance is one of the major challenge for implementing national education policy in mission mode and time bound manner. Policy document stated that 6% of GDP shall be spend on education. We may recall that 6% of GDP on education was promised in 1986 and now even after 34 years do we need the same amount in spite of so vast difference in population and socio-economic scenario of the nation.

A lot has been changed due to rapid growth, the ratio of demand and supply has been changed. Our GDP definitely increased in proportional rate but still there's requirement of deep rooted research regarding allocation of budget. If we do analysis on the basis of data regarding investment on education from various world leading countries on education and different department within the country we find that there is a mismatch. Policy document accept that we are presently spending about 4.43 % on education .69% on research and innovation. Ministry of science and technology expresses that for enhancing the research and innovation status in India it requires a 2% budget of GDP. A need based study should be conducted for allocation of budget as per the requirement of different endowment funds (inclusion fund, gender inclusion fund and scholarship fund etc.) mentioned in NEP.

Policy document prepared in light of the Indian ancient tradition of education .policy wish to establish India as a knowledge superpower. For this Nation need huge finance. In ancient time the finance for Education was not the sole responsibility of government. We should move forward as per the system in ancient India for availability of finance where it was responsibility of the society. Business class and the richest people. This is need of the hour that society, industrialist should contribute a fair amount to uplift and strengthen the education system of the nation. It can be mandatory for industry that at least 2% of their dividend must be allocated for enhancing the standard of education in our country under the corporate social responsibility. The transformation of finance system of education should be done

with cooperation and co-ordination between industries & society as well as the government allocation, Generation of fund is important for policy implementation.

- **Quality research and teaching:** As per policy document, quality research leads to quality teaching. Objective of research is to improve the quality of life. Research must be key function in policy framing and implementation. Research play the important role for any effective decision. Research is a backbone of policy and practice. In order to conduct quality research and dissemination of knowledge we must conduct quality research as per the requirement from the user perspective practitioner to lead the evidence based teaching learning. Researcher must know about end user requirement. Policy leads to be effectively implemented if we establish coordination between practitioner and researcher, researcher and end user. We should think how to overcome the gap between researcher, educational researcher, and educational practitioner that will lead to effective implementation of policy.
- **Technology, Network and Role transformation:** The COVID 19 pandemic has majorly affected the education system across the globe, including parents, teachers and educational administration where everyone is making their way to ensure the best practices for their students. It has led to the closure of schools in every country across the world, putting approximately 1.5 billion children and youth out of schools. Government entities worldwide have taken considerate actions to roll out remote learning through various channels to reach children at home, and make smart investments to support children's' education in new innovative ways. Teaching has moved online on an unprecedented level and students' evaluations are also moving online with much uncertainty for everyone. Many curriculum strategies have been revoked, reworked and reintroduced in many different ways. A lot of admin work also reshaped, which was supposed to happen before the beginning of the new session. Families play an essential role in education and have agreed to provide significant inputs into

learning process. Training the educators is another big challenge, which has been overcome in no time considering the mode of teaching has changed. Lack of networking, devices, electricity is another challenge to overcome these challenge. Policy emphasize virtual mode of learning and promise to create an autonomous body. The National Educational Technology Forum (NETF) will be created to provide a platform for the free exchange of ideas on the use of technology to enhance learning, assessment, planning, administration and so on, both for school education and higher education NEP (P-57-point 23.3.) The implementation strategy of the NEP must aim at providing a virtual university environment wherein all universities in India become collaborators, creating their own content or sourcing content. Implementation plan make provision to provide the devices at affordable cost besides ensuring network spread, transforming skilled workforce. Governments and other stakeholders, education system are struggling to meet the evolving needs of knowledge based society. Every stakeholder have to be trained in advance. Many of them do not have the required skills to cope up with changes in light of NEP.

- **Four –P Approach: Public, Private, Partnership and Philanthropy:** A Philanthropical ideology based organization should be established with collaboration of private sector participation in order to enhance quality, equity and access of higher education in light of NEP Provisions along with evaluation of implementation process of NEP.

5. Conclusion

National Education Policy 2020 is expected to have an intensive analysis in order to be effectively implemented and also requires intervention of different bodies for the transformation of roles of the connected bodies. It requires devotion, dedication, determination, commitment, along with spirit and intent of government. It also demands coordination

between state and central level. Timely infusion of requisite resources - human, infrastructural and financial will play major role to ensure effective implementation. Review of the implementation strategy shall be the key player of the policy success.

Some important issues which should be kept in focus while implementing NEP 2020-

- ❖ A need based study should be conducted for finding the problem of implementation. Creating awareness among public on the importance of education and implementation of policy and recommendations. Recommendation and implementation of any policy should be mandatory for all the concerns in education, failing in which shall withdraw the recognition and legal action shall be taken in time bound manner. Motivating all the faculty members, educational administrator for performing well according to their duties.
- ❖ Society participation can be increased for effective implementation of policy in the field of education. Time limit implementation concepts should be introduced.
- ❖ Political involvement cannot be considered and tolerated at any cost in education regarding appointment of faculty, vice chancellor appointment, fund distribution, accreditation and establishment of institutions. Political interference in the appointment of university teachers and administrators should be totally banned.
- ❖ Complete transparency should be maintained in the working of Executive/Academic Bodies and other Governing Councils, committee constituted for the implementation of the policy.
- ❖ As we know lack of adequate governance and monitoring are the important reasons for policy failure. For ensuring the Governance and monitoring, A Monitoring & Evaluation Committee should be set-up at State and District level so that the implementation is smooth and ensures time-bound implementation with fixed accountability.

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ANALYZING THE CONCEPTUAL MODEL OF SERVICE QUALITY AND ITS RELATIONSHIP WITH GUEST'S SATISFACTION: A STUDY OF HOTELS IN CHANDIGARH

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ABSTRACT

Nowadays, most industries use service quality in various fields. All industries are implementing five service quality dimensions: tangible, assurance, reliability, responsiveness, and empathy. This research aims to investigate hotels' service quality and its effect on guests' satisfaction in Chandigarh. Moreover, to find which service quality dimension has more effect than the other quality dimensions. In today's competitive business environment, the education sector is critical since it is regarded as an essential source of economic and income for the country. As a result, most countries are trying to attract local and international visitors to their destinations, allowing them to develop and improve their country's life. Guests' contentment relies heavily on the hotel's structure, guest accommodations, guest facilities, and activities. For a hotel to gain and maintain a competitive edge, it is critical to apply service quality dimensions that are effective and efficient to improve the current service at hotels, which ultimately results in student satisfaction. The hospitality industry's service quality goal is to provide guests with a high standard of accommodation atmosphere, and practically all hotels are able to obtain client satisfaction by providing can services. In most cases, guests are more concerned with the quality of service than with the price. As a result, they achieve a certain quality that satisfies the guests' needs and demonstrating this quality in practice is critical.

Keywords: *Quality, Service Quality dimensions, Hotel Guests Satisfaction, hospitality*

1. Introduction

In a highly competitive market, service quality has become a critical factor in building a sustainable competitive advantage and garnering clients' trust, and so gives an ideal opportunity for the hotel industry to differentiate itself. As a result, it is regarded as a vital core concept and success component in the hotel sector. Physical facilities, workers, and materials are the three dimensions of service quality. Furthermore, it is divided into two quality levels: functional and technical. A similar idea claims that service quality has three dimensions: functional quality, environmental quality, and technological quality. Another method to identify five elements of service quality are: assurance, dependability, empathy, tangibility, and accountability (Mukhles M Al-Ababneh, 2017).

In today's world, guests have become more sophisticated and demanding; also, it is critical to be familiar with visitors' locations, such as where they came from and their expectations, to adopt the proper tactics for improving the hotel service quality. In general, guests are in high demand; nevertheless, when it comes to the hospitality industry, the most crucial factor to consider is the service quality that the hotel

delivers to its customers. Given that service quality would result in visitor pleasure, implementing an adequate service quality will be essential. Guests will be dissatisfied if the hospitality industry provides poor service quality. Many hospitality industries are looking for and seeking to improve their systems' quality to gain and maintain a competitive advantage. All services supplied by the hospitality sector add value to its guests and raise the degree of guest satisfaction. Currently, certain hospitality sectors allocate a specific department to review and ensure the implementation of service quality in order to confirm visitor pleasure while also meeting their demands and expectations.

Furthermore, the critical success of a competitive market is based on offering high-quality service, which leads to increased guest pleasure. As a result, customers' evaluations of the quality of services in the hospitality sector are critical in improving and developing the business. Guest satisfaction has several advantages, such as fostering a positive relationship between hotel personnel and guests, which leads to the development and retention of loyal customers. The researcher's goal in this study was to use service quality characteristics as indicators to estimate guest satisfaction in Erbil hotels. Empathy,

assurance, dependability, responsiveness, and tangible are the five characteristics of service quality. These five criteria have a substantial impact on guests' perceptions of service quality. The five service quality categories are independent factors in this study, while guest satisfaction is a dependent component.

The most critical issues confronting the modern service sector is providing exceptional service quality and achieving client happiness (Hung et al., 2003). Many studies have empirically studied the relationship between these terms, finding that service quality has a considerable influence on customer satisfaction. However, few of them investigated the service quality characteristics that influence consumer satisfaction in the hotel industry. As a result, the primary goal of this study was to investigate the relationship between perceived service quality and customer satisfaction in the Croatian hotel business. The goal was to determine which aspects of hotel service quality were essential to hotel customers and significantly impacted their overall satisfaction.

Service quality and customer satisfaction

The hotel service sector represents for 38% of the value added in the World Economic Community, according to recent statistics. In this industry, quality and client happiness are vital! Numerous academics, like Knutson and Naumann, have established that customer happiness is the least expensive kind of promotion. As a result, quantifying service quality and customer satisfaction improves the business both qualitatively and quantitatively. Achieving a high level of service quality and customer satisfaction leads to enhanced customer loyalty, increased market share, higher returns on investment, cost savings, and a competitive edge. Service quality can benefit a business in a variety of ways, including increasing client satisfaction, improving the company's image, cultivating customer loyalty, and offering a competitive advantage. Service quality performance can mean different things to different individuals; for example, workers may have a more positive opinion of service quality than consumers, therefore managers and their staff loathe identifying service quality issues.

2. Literature Review

Haemmoon & Kawon, (2017) define satisfaction as “a person’s experience of gratification as a result of comparing specific service or product or even transition perceived outcome or performance in terms of the expectation.” It has been proved that when the service quality fulfills the expectations and needs of the guests, the guests are satisfied with the service quality delivered. Meeting the expectations of guests in the hotel industry, on the other hand, is a difficult challenge. Speed has become the most valued and new competitive advantage in many sectors. The product life cycle is being reduced from years to weeks as technology advances. Guests in the hospitality industry demand quickness to meet their expectations and needs. Those who can fulfill will win, while those cannot be passed over (Juan et al., 2017). Many academics and researchers have recently debated the question of satisfaction. At the moment, the hospitality industry is paying close attention to customer satisfaction. As a result of the visitors’ displeasure, the hotel’s image suffers, resulting in a lack of recommendation from previous and present guests to others, and they may move hotels. All of the things the hotel does to improve service quality can be regarded as zero if the visitors leave unsatisfied. Today, the most difficult challenge is still meeting the needs of guests (Raditha, 2017).

One of the main elements in service quality is considered by the quality process. As a result, organizations that provide services do not have products; nevertheless, they have interactive processes. Because services are intangible, it is difficult for organizations to analyze and measure them (Appaw-Agbola&Dehlor, 2011). Various academic scholars have produced multiple key service quality definitions. According to (Blesic et al.,2013), service quality is the difference between what guests expect from the service provider and how they evaluate the services. (Chikwendu et al., 2012) established an additional definition, stating that service quality is a disparity between guests’ expectations for service implementation before the service encounter and their observations of the rendered services. According to Puja and Yukti (2011), service quality is a specific assessment and consideration made by guests

between expected service quality and supplied services. Because of the many claims created by various researchers, quality is a little more challenging to detect than visitors' contentment and enjoyment. Quality is focused on observing and evaluating guests; so, quality is defined as whatever the purchaser views as a quality (Sivesan, 2013). According to (Yadav&Dabhade, 2013), expectations and quality standards are two significant aspects that determine visitor perception. The term "expectations" refers to what the pupils are expecting from the service provider. Because providing services in the hospitality sector continually jeopardize human beings, it should concentrate on the administrative staff, particularly the collaboration between administrators, guests, and suppliers (Abukhalifeh& Mat, 2012).

Hospitality industry

The hospitality industry is a broad area, and many people think about the types of organizations that consider hospitality brands, but only a small percentage can explain what is and is not the company fairly and appropriately. This means the essence and style of the organizational changes, the types of food and celebrations, and the levels of knowledge and competence used at all levels of the corporation. The hospitality sector encompasses a wide range of organizations and administrations associated with recreation and client happiness. Hallak, Rob, and Etal (2019) also highlighted the distinctive component of the hotel business, which concentrates on the idea of luxury, pleasure, pleasure, and experience rather than supplying food for necessities and core values. They also highlighted three segments of the hospitality business, such as restaurants, bars, and takeaways. Venn et al., 2018; Australian Wellness Organization, 2012). On a global scale, it is estimated that the foodservice industry exchanges more than USD 500 billion daily (Newson et al., 2015).

The second most crucial thing to keep in mind when focusing on the restaurant business is to maintain the quality of the cuisine in order to offer customer happiness. According to Bowman and Vinyard (2004), restaurants should consider the quality of the food they

serve to their clients. The restaurant's food should strive to solve the challenges and the customers' constantly changing desires (Buckley, Cowan, McCarthy, & O'Sullivan, 2005). Part of the critical approach that restaurants use to ensure that the hiring of highly skilled chefs results in outstanding meals. Simultaneously, it entails ensuring that the comments and recommendations made by customers are taken into account. It is critical to ensuring that customers have access to high-quality food (Campos and Nobrega, 2009)

The Indian government (2006) plans to develop numerous towns into MICE destinations, beginning with Chandigarh. The goal of this study is to ascertain the existing state and future prospects of MICE tourism in Chandigarh, dubbed "the city lovely," and its environs. According to a 2010 MGI research, the Chandigarh capital region is experiencing the fastest growth and is one of the most popular places to live in the country after Delhi (National Capital Region). The Chandigarh Capital Region, sometimes referred to as Greater Chandigarh, is comprised of the Chandigarh Union Territory and adjoining districts in the states of Haryana, Himachal Pradesh, and Punjab. Northern India's central business district is located in this region (north of Delhi). Panchkula, Mohali, and other nearby suburbs are included in the area. Chandigarh is a planned city in India, with world-class architecture. Chandigarh is home to the world-famous Rock Garden, which was mostly made from discarded materials. The "Rose Garden, Garden of Annuals, Fragrance Garden, Hibiscus Garden, Chrysanthemum Garden, Botanical Garden, and Shanti Kunj" is another well-known garden. Already, Chandigarh hosts major international and national exhibits and conferences such as "Agro Tech, Auto Shows, and Consumer Fairs." The city offers first-rate Convention & Conference facilities. Mohali, also known as SAS.

The city's key infrastructural installations include the International Airport, the PCA Stadium (one of India's greatest international cricket stadiums), and the Mohali Sports Complex. Despite the fact that it now lacks a flagship MICE facility, bids are being sought to build a world-class international convention centre with a capacity of 4000 people.

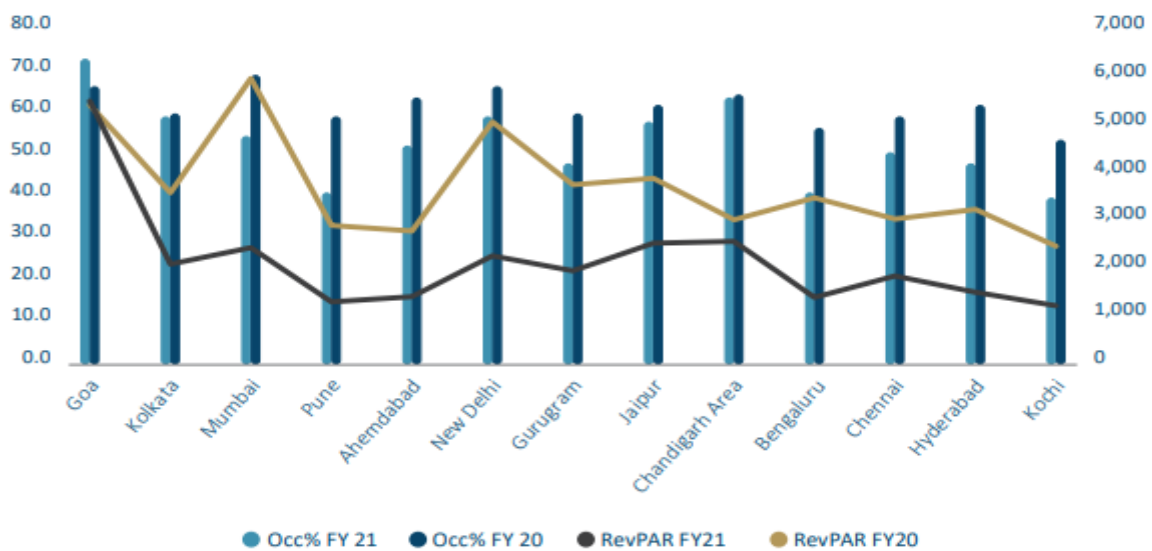
Panchkula is a thriving Haryana town. It is a furniture and steel production centre. Numerous MICE service providers, such as hotels, travel agencies, airlines, event management companies, convention centres, and transportation businesses, now offer services to help cities convert into MICE destinations. It investigates the processes required to develop Chandigarh into a MICE destination.

Indian Hospitality and Tourism Industry

According to Ministry of Tourism statistics, foreign visitor arrivals (FTAs) in India average more than 10 million each year. FTAs totaled 2.68 million in CY 2020, down from 10.93 million in 2019. FTAs were just 0.21 million tourist arrivals between April-December 2020, compared to 7.75 million arrivals over the same period the previous year, representing a 97 percent reduction. According to Horwath HTL Market Report: India Hotel Market Review 2020, occupancy was 34.5 percent during the calendar year, with occupancy at 27.8 percent during the pandemic period of

March to December 2020. However, occupancies began to improve in October 2020, averaging 38% from October to December 2020.

The occupancy rate at the 13 Indian destinations studied by STR, a global hotel data analytics organization, was 49.6 percent in Q4 FY 2021, compared to 56.1 percent in Q4 FY 2019-20, with a 39 percent decrease in Revenue per Available Room (RevPAR). As indicated in the data below, Goa had an occupancy rate of 70.1 percent during this period, up from 63.8 percent during the same period the previous year. Occupancy rates in Kolkata and Chandigarh were similar to the previous year. Delhi had a 57.3 percent occupancy rate among the cities with considerable room inventories, while Mumbai had a 52.3 percent occupancy rate. Gurugram, Chennai, and Bengaluru had occupancy rates of 46.3 percent, 48.8 percent, and 39.2 percent, respectively. Except for Goa, most locations' RevPARs were weak due to surplus supply and limited demand.



India Occupancy % and RevPAR by Cities for the Fourth Quarter

3. Objectives of the research

This research has following objectives:

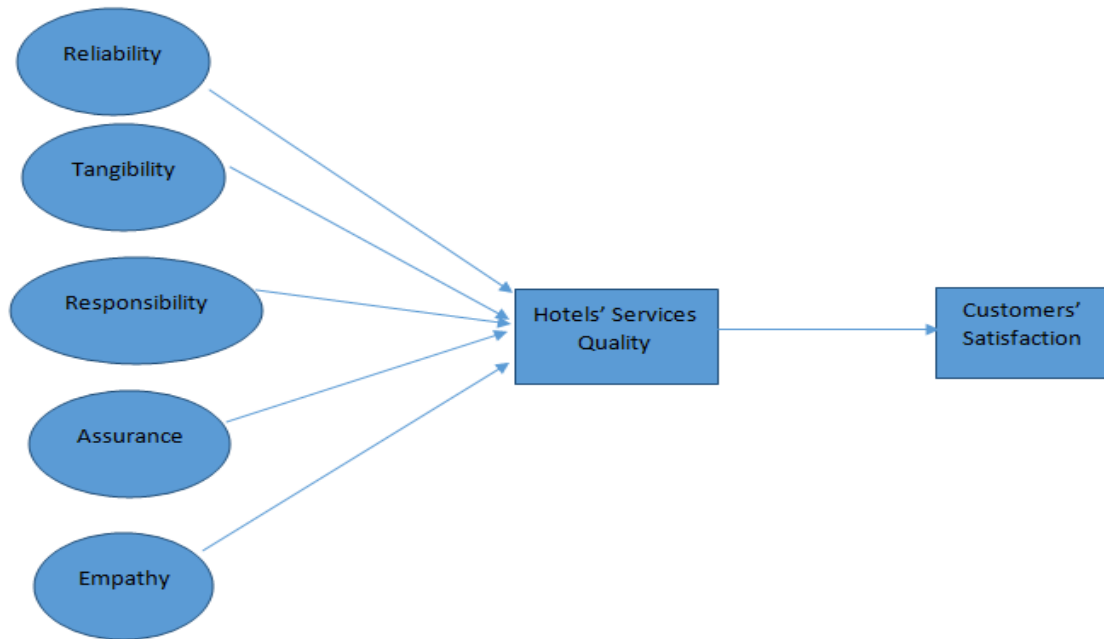
- To study the Conceptual model of Quality Services
- To study the relationship between quality services and guest satisfaction

4. Methodology

The research is descriptive and analytical based. The data have been collected from 50 respondents (guests from hotels in Chandigarh) for this research based on objectives. The hotels chosen from Chandigarh are Taj Hotel, Lemon Tree Hotel and Hotel the Yellow. The respondents would be ask questions based only

on Quality services provided by the selected hotels. The research has been done below conceptual model of quality services:

Conceptual Model:



5. Data Analysis and Interpretation

Demographic Variables

We have taken the respondents of different age, gender, marital status, education and business category.

Variables	Frequency	Percentage (%)		SD
Age:				
<30	12	24		
31-40	18	36	16.67	4.16
40>	20	40		
Gender:				
Male	39	78		
Female	11	22	16.67	20.10
Other	0	0		
Educational Qualification:				
<HSC	1	2		
UG-PG	27	54	16.67	13.79
Others	22	44		
Marital Status:				
Married	32	64	25	9.89
Unmarried	18	36		
Occupation:				
Govt. Employee	4	8		
Private Employee	26	52		
Self-Employed	7	14		
Student	2	4		
Housewife	6	12	8.33	8.82
Retired	5	10		
Monthly Income:				
<25,000	5	10		
25,000-50,000	21	42	16.67	10.21
>50,000	24	48		

Table 1: Demographic Variables

From the table 1, it can be analyzed that the respondents visits to the selected hotels having 90% people income more than 25,000 per month. 78% respondents were Male. Most of

the respondents (52%) belong to private employees. Out of survey, 98% respondents were highly educated.

Service Quality – Results

Items	No. of respondents (agreed/totally agreed)	Mean	SD
Visually Appealing Physical Facilities	31/50	1.5009	1.0019
Employees neat appearance	35/50	1.5591	1.0119
Employees should always be willing to help customers	40/50	1.8880	1.1201
Behaviour of employees should instill confidence in customers	41/50	1.7991	1.1151
Employees should have the knowledge to answer customers questions	31/50	1.5009	1.0020
Quality of Food provided by hotels	42/50	1.8890	1.2101
Quality of Housekeeping provided by employees	44/50	1.9251	1.5017
Other Exteriors	24/50	1.2401	0.8367

Table 2: Service Quality – Results

The goal of this study was to look into the current level of service quality in the hotel business in terms of tangibles, dependability, responsiveness, assurance, and empathy. Table 2 shows the level of quality disconfirmation scores for each SERVQUAL item for all

subjects that responded to the questions. From the table 2, it was found that food and housekeeping services provided from the hotels were most significant and in quality way. Customer Satisfaction

Predictors	t-value	p-value
Reliability	0.241	0.492
Tangibility	0.697	0.801
Responsibility	3.790	0.0003
Assurance	0.358	0.7480
Empathy	0.619	0.5589

Table 3: Predictors of Customer Satisfaction

The predictors of five dimensions are listed in Table 3, along with their level of significance in connection to customer satisfaction. From the table 3, it is found that services provided by the selected hotels were highly reliable and tangible. They also provided highly assured services i.e. one can visit hotels and must be satisfied with their services and the customers would be loyal for the hotel industry. Also, the responsibility of the hotels shows most significant, it shows they are very responsible towards customers' need.

6. Conclusion

Providing comfort and exceptional service is frequently the most critical success criterion in hospitality. While having an impressive structure and employing the best marketing strategy can be critical in acquiring new markets or retaining old ones, the interaction between staff and guests — or hotel customer

service — frequently determines whether they will return or take their business elsewhere. Some of the world's best hotels owe much of their success to their ability to stress comfort and high-quality service at every stage of the customer's journey, from booking through check-out. According to the results (shown in table 1-3), the level of quality disconfirmation in five categories was as follows: tangibles (.697), empathy (.619), responsibility (.379), reliability (.241), and assurance (.358). Due to the fact that all quality disconfirmation scores were positive, the subjects' perceptions (actual) were greater than their expectations, and the subjects expressed various degrees of satisfaction with the service quality at the selected hotels. Additionally, the findings indicated that only responsibilities were significant predictors of overall satisfaction with the hotels' service quality. With this Customer services quality and other staff

members can get benefit greatly with the supports they provide to customers since with

their services customers become loyal for the hotels.

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ASSESSING THE QUALITY SATISFACTION OF VISITOR ON SELECTION OF FOOD AND BEVERAGES OUTLETS: A CRITICAL STUDY ON OUTLETS OF DELHI**J. Kumar¹ and A. Kumar²**^{1,2}School of Hospitality Tourism & Airlines, CT University, Ludhiana Punjab
jeetuihm@gmail.com**ABSTRACT**

Travel and tourism are among the fastest expanding sectors in the world. They encompass a wide range of services, including lodging, transportation, food and beverage service, local culture, and various other factors. The food and beverage industry is essential because most tourists spend more than 25% of their budget on food and beverages. Increasingly, people are spending a more significant proportion of their food expenditure on beverages and foodstuffs. According to researchers, tourists' views of food and beverage service features in rural locations are particularly essential in determining their level of satisfaction and future behavioral intentions in the food and beverage service industry. Nowadays, the majority of tourists are concerned with the manner in which their food and beverages are supplied to them, making it essential to evaluate the overall quality of food and beverage service provided by restaurants and other institutions in general. The purpose of this study was to determine "how satisfied tourists were with the quality of food and beverage service in Delhi and the National Capital Region (NCR)." Among other things, this study will allow us to assess the level of tourist satisfaction and perceptions of "food and beverage service quality in food and beverage enterprises in Delhi NCR, based on the observation and comments of tourists who visit food and beverage outlets in Delhi NCR".

Keywords: food and beverage, service quality, tourist satisfaction, Travel

1. Introduction

It is the quality of the services offered to guests that determines the development of each tourist site. Individuals are affected by a wide range of activities linked with transportation, tourism, and recreation, and these activities have a significant impact on the group, social, and monetary perspectives of life held by the majority of the population. Consequently, any tourism site needs to concentrate on how food and beverages are given to travelers and whether the food and beverages are suitable in terms of authentication, hygiene and freshness, and atmosphere and personnel features, among other things.

According to the list of top attractions in Delhi, we have chosen the geographical area of District Delhi NCR for this research work because, in terms of popularity and attractiveness, Delhi NCR ranks first among tourist destinations in the northern India region, according to the list of top attractions in Delhi. The majority of visitors to Delhi NCR are from small towns and cities throughout the country.

Because it is the capital city of India, visitors have higher expectations for the quality of food and beverage service there than elsewhere. The quality of food and beverage service provided by restaurants is not critical in Delhi NCR, however, because the city has abundant resources. This is especially true when people are traveling from one destination to another, and there are numerous restaurants to choose from in the interim, making it less critical.

In order to have a satisfying supper, good cuisine is essential, and the level of service provided in restaurants is necessary (Dr. Tembi Maloney-2016). Specifically, the goal of this study was to measure tourist satisfaction with and perceptions of the quality of food and beverage service at restaurants and dhabbas located in the Delhi NCR and nearby regions.

Some branded family outlets data in revenue

“Revenue Growth of Key Players in INR crore”.

Company/Brand	FY 2013	FY2014	FY 2015	FY2016	FY2017	CAGR 2013-16
QSR						
Jubilant Food Works/ Domino's	14.15	17.35	20.95	24.40	19.35	20%
Westlife**/McDonald's	6.80	7.40	7.65	8.35	9.3	7%
Conaught Plaza Restaurants/McDonald's	7.45	7.20	7.25	7.30	NA	-1%
KFC	12.50	12.85	12.50	12.25	NA	-1%
Subway	3.55	4.35	5.60	6.80	NA	24%
CDRs						
Pizza Hut*	6.00	6.50	6.90	6.25	NA	1%
Specialty Restaurants	2.25	2.65	3	3.21	2.37	13%
Barbeque Nation	2.75	3.60	4.40	3.95	NA	13%
Café						
Café Coffee Day	10.75	11.85	11.25	12.45	9.32	5%

“*Pizza Hut revenue includes revenue from both formats **Westliferevenue of 12 months in FY 2017”

Source: Jubilant Foodworks, Westlife,

QSR brands worldwide that operate in India, such as “McDonald's, KFC, Pizza Hut, and Burger King, are the dominant players in the chain restaurant business.” Globally, foreign brands account for around 37 percent of total outlets in the chain market, with international brands contributing for 45 percent of overall revenue in the chain industry as a whole. When it comes to foreign brands, the QSR sector accounts for roughly 70-75 percent of sales, followed by CDRs, which account for approximately 50-55 percent of sales in their home markets.

Brands such as "MotiMahalDelux and SagarRatna, both owned by Indian entrepreneurs, dominate the value category in the casual dining industry, whereas Multinational corporations own barbeque Nation, Mainland China, and Sigree."

Indian consumer-oriented sectors are currently in the worldwide spotlight thanks to the country's expanding economy and large population (1.3 billion people). Several households have sprung up as a result of shifting cultural dynamics and family patterns in the community. Food consumption from nontraditional sources has increased dramatically due to the influx of new

households into the market (non-home cooked food).

2. Literature review

This section looks at some of the most notable pieces of literature on the subject. Because of the rapid growth of the food and beverage industry, people have a plethora of options, which has led them to place a high value on the quality of food and beverage service. Although just a few people have researched this topic, there are several related themes available. The purpose of this section is to explain – “why the quality of food and beverage service is critical to the satisfaction and perception of tourists at any establishment that serves them.”

Rogers (2005) defined formalized jargon as Consumer demand for high-quality foods, owner and shareholder demands for increased efficiency, rising food prices, rising operating and labor costs, and almost unavoidable government regulatory requirements are just a few of the numerous challenges that the food and beverage industry must contend with, according to the author. Unfortunately, they are not the only limitations and issues that must be addressed. There are many more.

In their study, Namkung and Jang (2010) identified food quality as a critical factor

influencing consumers' overall ratings of a restaurant and their inclination to return to the establishment. Tasting and presenting foods to customers are essential indicators of the food's nutritional value and nutritional value. As previously stated, the physical environment is another crucial factor in attracting consumers' attention in the restaurant industry. After researching five main restaurant factors - meal quality and quantity, service quality and value, atmosphere and convenience - Kim et al. (2009) discovered that each of the five aspects had a significant impact on total consumer satisfaction in his study.

The researchers also observed that consumer satisfaction is significantly influenced by food quality (such as taste and food safety), service reliability, cleanliness of the environment and the design of the interior, as well as neat and well-dressed employees (2009).

Cheng-Wen Liao's (2013) work is an excellent example of this. According to the study's author, "the cleanliness of the environment, the comfort of the seats, and the safety and hygiene of the passengers are the most critical factors in determining customer satisfaction with service quality." The cleanliness and hygiene of the environment are the objectives for emphasizing the quality of service of food and beverages outlets.

In (2015) identified a link between service quality, food quality, and overall client happiness in the study conducted by Al-Tit, Ahmad A. Furthermore, the quality of service has a positive impact on the retention of customers. In a similar vein, customer happiness positively impacts client retention and serves as a link between high-quality

service and customer loyalty. According to the conclusions of this study, providing high-quality service increases customer satisfaction and helps to increase customer retention.

3. Objectives of the study

The objectives of the research has been illustrated below:

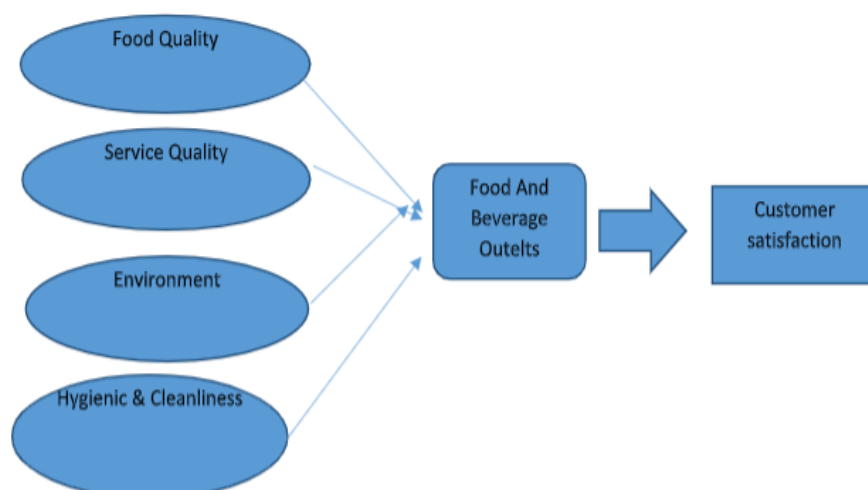
- To determine tourist satisfaction with the quality of food and beverage service at food and beverage outlets in Delhi NCR.
- To ascertain tourist perceptions of food and beverage quality in outlets of Delhi NCR.

4. Research methodology

The research is descriptive and analytical based. Primary data will be gathered by tourists (domestic and international) dining in various restaurants such as "fast food and restaurant dining. Secondary data will be acquired from journals, periodicals and articles published in print, and internet sources. Using the convenience sampling technique, data from the respondents was collected from customers who were on their way to or from Delhi NCR in this study. A total of 100 responses were obtained from the survey participants. It was used to assess the overall performance of all elements that influence customer happiness. The information was gathered from travellers who used the services offered by Delhi's eateries.

Research model

In order to understand the current situation and evaluate the elements that influence consumer satisfaction in food and beverage outlets in Delhi, a qualitative technique is employed.



Variables of the study

In the research, numerous variables are investigated to determine which component has a more substantial impact on customer satisfaction than the others. Some of the most often encountered variables in research projects are listed below:

Food Quality

Food was palatable
Food was fresh

Service Quality

Willingness to help guests
Attitude and behavior of service staff
Quality of service and efficiency of staff
Food service was delivered on time

Environment -

Layout & design of food outlets
Seating arrangement

Theme of the restaurant
Flooring, ceiling and wood work

Hygienic Cleanliness

Standard of hygiene
Grooming and personal hygiene
Cleanliness of the food outlets and ancillary section
Surrounding areas of the food outlets

Customer Satisfaction

Satisfaction rate at food and beverage outlets
Recommend outlets to your friends and relative
Would you choose again
Overall satisfied with outlet performance

5. Data Analysis and Findings

The preference of F&B outlet

- Demographic Findings:
Analysis gender category

Gender	Frequency	Percent	cumulative
Male	55	55.0	55
Female	45	45.0	100
	100	100.0	

Table 1: Gender Ratio of respondents

Figure analysis (AGE- WISE)

Age Section			
	Frequency	Percentage	Cumulative %
18-24	30	30	30
24-34	25	25	55
34-44	35	35	90
44-55	10	10	100
Above 55	100	100.0	

Table 2: Age ratio of respondents

Demographic characteristics of the sample

Different food outlets			
	Frequency	Percentage	Cumulative %
Branded	20	20	20
Fast Food Outlets	30	30	50
Coffee shop	32	32	82
Takeaway	10	10	92
other	8	8	100
Total	100	100.0	

Table 3: Demographic based characteristics

As can be seen in Table above, male respondents account for 55% of all responses, while female respondents account for 45%. The respondents were divided into the following age groups: 18-24 years (20.0 percent), 25-34 years (30.0 percent), 35-44 years (32.0 percent), 45-54 years (10 percent), and 55 years and older (20.0 percent) (8 percent). The findings reveal that respondents

of different ages chose their food outlets in a manner that is distinct from their age group, as seen in the table. As a result of the findings, customers travelling on the national highway have a different preference when it comes to choosing a food outlet. Only 20.0 percent of respondents choose a branded restaurant, 30.0 percent choose fast food outlets rather than branded restaurants because they have little

time to spend in food outlets, and 10.0 percent customers choose take away outlets because they are pressed for time.

When it comes to food and beverage businesses, customer satisfaction is related with a positive association between food quality and service quality as well as the physical environment, hygiene, and cleanliness of the establishments. Customer satisfaction is

investigated in this study in order to determine the most significant factor that has a significant impact on customer satisfaction. "Four factors (food quality, service quality, physical environment, hygiene, and cleanliness) are examined in order to determine the relationship between customer satisfaction and these factors."

Correlation between various parameters

Dependent Variables Independent Variables		Customer Satisfaction Rate	Would you choose again	Recommend outlets to others	Overall outlet performance
Food Palatable	Pearson Correlation	.52"	.64"	.64"	.58"
	Sig. (2-tailed)	.000	.00	.000	.000
	N	100	100	100	100
Food was fresh	Pearson Correlation	.51"	.68"	.55"	.45"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
SERVICE VARIABLES					
Willingness to help guests	Pearson Correlation	.56."	.76"	.64"	.65"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Attitude & behavior of service staff	Pearson Correlation	.50"	.61"	.60"	.50"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Quality and efficiency of service staff	Pearson Correlation	.51"	.61"	.57"	.65"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Food Delivered on time	Pearson Correlation	.55"	.69"	.62"	.63"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
PHYSICAL ENVIRONMENT					
Layout & design of food outlets	Pearson Correlation	.39"	.51"	.53"	.63
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Seating arrangement	Pearson Correlation	.35"	.44"	.48"	.35"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Theme of the restaurant	Pearson Correlation	.45"	.62"	.55"	.56"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Flooring, ceiling and wood work	Pearson Correlation	.28"	.44"	.33"	.52"
	Sig. (2-tailed)	.000	.000	.000	.000

	N	100	100	100	100
Standard of hygiene	Pearson Correlation	.44"	.62"	.55"	.56"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Grooming and personal hygiene	Pearson Correlation	.58"	.65"	.66"	.70"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Cleanliness of food outlets & ancillary section	Pearson Correlation	.56"	.62"	.60"	.67"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Surrounding areas of food outlets	Pearson Correlation	.60"	.67"	.65"	.68"
	Sig. (2-tailed)	.000	.000	.000	.000
	N	100	100	100	100

Table 4: Correlation of Selected Parameter

As the preceding table indicates, the independent variables are highly correlated, but Food Palatable has a positive association with customer satisfaction, indicating that customers who find food palatable will recommend food outlets to their friends and relatives. The number indicates the significant connection between ($r=.69''$ and $.64''$). The culinary characteristics also have a strong substantial correlation with customer satisfaction. Additionally, customers recommend food establishments based on the freshness of the meal and the crispiness and flavour of the cuisine. The value indicates the significant association between ($r=.68''$ and $.61''$). The independent variables of service quality have a strong correlation with customer satisfaction; willingness to assist guests, attitude and behaviour of service staff all have a positive correlation with customer satisfaction, indicating that customers appreciate the services offered by food outlets and are willing to recommend them to friends and family. The value represents the correlation between ($r=.76''$ and $.64''$), which is quite strong. Customers are completely satisfied with the timely delivery of meals, as demonstrated by the correlation coefficient of ($r=.69''$). As shown in Table 4.3, the independent variable, namely the layout of food establishments and their seating arrangements, has a positive connection with customer satisfaction. Correlations between the layout and seating arrangements and dependent variables are significant. The score indicates the significant

association between ($r=.53''$ and $.48''$). The study established a substantial association between the theme of outlets and the degree to which clients are satisfied with the performance of food establishments ($r=.52''$). As a result, it is possible to conclude that there is a significant correlation between the independent and dependent variables. The maximum value represents ($r=.70''$ and $.68''$), which indicates the food outlets' overall performance.

6. Conclusion

Researchers observed links between the "destination image," perceived quality, contentment, the intention to return, and the inclination to recommend a place to others in the context of vacationers visiting resorts. To ensure that tourists are satisfied, destination marketers should pay attention to critical aspects that can persuade them to visit their destination(s). In this study, it was discovered that the overall Delhi destination image, which included opportunities for "adventure, exciting nightlife and entertainment, relaxing, pleasant, friendly and trustworthy people, communicative people, safety, and appealing tourist sightseeing and activities, had a positive relationship with a desire to return." The association between the image of street food and the desire to return was strong. The photographs of food are divided into two categories: images of food and images of restaurants. From the study, it can be concluded that the satisfied clients refer food

establishments to their friends and relatives and return to the same establishments on subsequent visits. Customers benefit from the outlets' overall eating performance. Customers will continue to patronise the food outlets

based on this relationship in the future. Positive relationships exist between grooming, personal hygiene, and the cleanliness of food establishments, ancillary sections, and surrounding regions of food establishments.

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A STUDY OF CHRISTIAN MYTHS IN GALWAY KINNELL'S SELECT POETRY

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ABSTRACT

This paper presents the multiple Christian myths that Kinnell has employed in his poems. Kinnell explains how these myths contradict the human mind that do not let them liberate. His ideas of living life are to live happily without believing in unrealistic. Kinnell suggests that one should not think in which one does not find any reality. Therefore, this paper studies the myth as organized by the society or ancestors.

Keywords: Myth, Christian Myths, Death and Resurrection, Salvation, Heaven.

Introduction

Galway Kinnell was born to Irish and Scottish immigrants on Feb 1, 1927, in Providence, Rhode Island, and rose in the nearby town of Pawtucket. During his childhood, Kinnell was introverted. He has no interest in school and spends much of his childhood wandering through the nearby Seekonk Woods. A copy of Francis Turner Palgrave Golden Treasury, published in 1861, reveals him to the hypnotic poems of Edgar Allan Poe. It makes his interest in poetry and literature. Later, at the age of twelve, Kinnell starts his writing career. He has eleven collections of poetry; First Poems (1946-1954), What a Kingdom It Was (1960), Flower Herding on Mount Monadnock (1964), Body Rags (1968), The Book of Nightmares (1971), Mortal Acts, Mortal Words (1980), The Past (1985), When One Has Lived a Long Time Alone (1990), Imperfect Thirst (1994), Strong Is Your Hold (2006), and Last Poems (2012-2014). His complete poems contain two hundred fifty-seven.

Besides poetry, Kinnell has penned one novel Black Light (1966), and one children's book, How Alligator Missed the Breakfast (1982). He also wrote essays like "The Poetics of Physical World" (1969), "Thoughts Occasioned by the Most Significant of Human Events" (1982), "The Fundamental Project of Technology" (1983), and "Remarks on Accepting the American Book Award (1984) and edited "The Essential Whitman" (1987).

Kinnell has won several prestigious awards, including Pulitzer Prizes for his Selected Poems, Shelley Prize from the Poetry Society of America, the Medal Merit from the Institute of Arts and Letters, the American Book

Award, and the State Poet of Vermont. Kinnell's poetry contains several themes like nature, religion, death, politics, and myth.

Myth

This paper particularly studies the use of Christian myth in Kinnell's poetry. Myth is a symbolic narrative, usually of unknown origin and at least partly traditional, that seemingly relates to actual events and is especially associated with religious belief. In *Dictionary of Critical Theory*, Roland Barthes describes myth as "it speaks directly to the viewer as a magical object appearing in the present, without any trace of the history that produced it" (262).

Christian Myths

Several pieces of evidence exist from statements made by Kinnell to demonstrate the myth of the crucial role plays in his work. The obvious place to begin with Kinnell is to examine his use of Christian mythology. His Christian myth contains the death of Christ, His resurrection, and salvation.

Ralph J. Mills Jr. says that Kinnell brought his concern with man's spiritual compulsions and appreciation in "The Supper After the Last." He further writes:

By exposing what Kinnell believes to be the hopeless falsity of these longings for eternity and confronting death as an unconditional fact in a hard, ongoing way. He prepares as the ground for his future writing certain existence limitations. We can surmise, I think, that Kinnell has purged himself in the poems we have discussed of personal anxieties and questionings concerning death, Christ, the purpose and goal of existence. (6)

Reiter is more forceful in her assertion that Kinnell rejects Christian myth. She asserts that although poems such as “The Avenue Bearing the Initial of Christ into the New World” have “recurrent references to Christian myth,” much of Kinnell’s work is “unaided by myth” (7)

Death and Resurrection

As Mills has aptly demonstrated, many of Kinnell’s early poems relate his youthful disillusionment with orthodox Christianity. But despite the rejection found in poetry such as “To Christ Our Lord” and “First Communion,” Mills writes of Kinnell’s attitude towards Christ:

If Christ is not be found in any truly apprehensible from it churches, His spirit and example still persist in the boy’s mind, influencing the view he takes of his experiences and actions. (10)

Kinnell rejects the decayed orthodox metaphors in which Christ displayed. For Kinnell, the central symbolic figure of Christianity is Christ crucified, and this symbol is the right image for the world’s conditions.

In the poem “The Supper After the Last,” Kinnell describes the false myth of the afterlife. He claims that there is no other life after death. Death is the end. The poet describes death through a wild man who happens to be Christ himself:

The wild man rises. Opening

His palms he announces:

I came to astonish

=But to destroy you...

Your lech for transcendence?

I came to prove you are

Intricate and simple things

As you are, created

In the image of nothing, (37-47)

In the reference mentioned above, Christ Himself announces that there is no afterlife. Christ declares that He came to warn humans not to hope or lust for transcendence. He says that humans are made of nothing, and they will turn into nothing. Therefore, human has to die, and there is no afterlife.

In Kinnell’s Christian myth, the image of Christ crucified permeates all of Kinnell’s poetry. Christ is a representative of human suffering and tragedy. The suffering of Christ

is a symbol of the continued presence of suffering and evil in this world. Christ, the god-man murdered, is the symbol for a world that each generation believed could reach the happy kingdom because it was just around the corner. Therefore, Kinnell claims that Christ is dead.

The Christ riding the death horse preoccupies Kinnell’s poetic imagination throughout most of his work. This preoccupation is conscious and overt in early poems such as “Easter” and “The Descent.” Section 3 of the poem “The Descent” describes the poem character named Jan. He is one of the climbers among Kinnell:

As clothes to a scarecrow

Or the flesh to a cross? Down snow,

Following streambeds through the trees,

We sledged him. To his valleys

Rivers have washed this climber to the sun

The full moon pestled into the earth again.

(55-60)

The above reference describes Jan’s death and his lonely descent into the cold and dark abyss “crevasse” (12). The poem asserts the true darkness of death that waits for us all. The images of scarecrow and “flesh to a cross” (56) echo the suffering and death of Christ, and Jan’s descent parallels Christ’s descent into hell. The sun and moon also perform important symbolic functions. Earlier in the poem, we are told that Jan has mistaken the moon’s rising for the sunrise. The sun is traditionally associated with life and the life-giving principle in many mythologies, including Christianity. On this topic, Alan Watts writes:

However, because the sun itself in both its daily and annual course is seen as a type of Christ, the Sun of Justice, the Christian Year is rather significantly integrated with the cycle of the sun. (16)

Yet, although the sun symbolizes the beginning of life, the moon waxes, wanes, disappears, and reappears. It dies and comes back to life that represents the ever-recurring cycles and rhythms of life.

In “The Descent,” the symbolic function of the moon is mentioned and dismissed as Kinnell writes that the dead “lie where nothing but the moon can rise? And make no claims, though they had promise” (65-66). As Mills asserts, formal religion promises resurrection, a

resurrection that does not occur in the poem. Kinnell is aware of the darkness, death, and suffering over the human spirit. Section four of the poem relates:

I looked for Indian Hill at Easter.
It was bulldozed. A TV cross
Like sticks of a scarecrow. Once more
I turned and ran: I stumbled on
Fields lying dark and savage and the sun.(73-78)

Easter is the most important feast of the annual circle of the Christian year. It represents the fulfilment of the work of Christ, the resurrection of his body from death. Easter is also derived from the pagan, Anglo Saxon 'Eostre,' goddess of dawn. The poet describes Indian Hill as bulldozed by the encroachment of civilization. He returns to the images of the cross and the scarecrow, but they are ironic. The cross is a TV cross, without flesh, and the scarecrow is without clothes. These implications indicate that the world is without Christ.

The poet reveals the abandonment of Jesus by God. The tone of the last stanza reveals the desolation Christ "Stands in a desolate sky / Feeding at its own heart" (92) and crying out "Eloi Eloi" (94). Christ's terrifying realization of his abandonment and isolation that even the father of Christ, Lord, could not even save him from death. Therefore, Kinnell claims that death is final to everyone, including the death of Christ, and there is no resurrection.

Kinnell rejects the myth system of Christ's resurrection. The myth of orthodox Christianity fails to explain the death and suffering that exists in the world. The poet says that death and sufferings are the universal truth, and they will never be eliminated. In his essay, "The Poetics of the Physical World," Kinnell writes:

Avoid beliefs which fill the emptiness which sweeten the bitterness. Avoid the belief in immortality, and belief in the usefulness of sin, and the belief in the guiding hand of Providence. (44)

In the above reference, Kinnell says that one must avoid beliefs that bring nothingness. He also suggests not to believe in the resurrection and the importance of sin. Kinnell declares

that one should not hope for a guiding Lord or hope.

Kinnell declares that the myth of the Christian belief of resurrection after death is false. Humans should take death as natural and the reality of ending. Therefore, the poet claims that death is the end of human life.

Salvation

In Kinnell's poem, there is no salvation or redemption because his focus is always on the death of Christ and the descent into the abyss, not on the resurrection and ascension into heaven. The poem "The Avenue Bearing the Initial of Christ into the New World" gives the descriptions of the bleak urban life on Brooklyn's Avenue C:

Through dust-sustained windows over storefronts

Curtains drawn aside, onto the Avenue
Thronged with Puerto Ricans, Negroes, Jews,
Baby carriages stuffed with groceries and babies,

The old woman peer, blessed damozels
Sitting up there young forever in the
cockroached rooms,
Eating fresh-killed chickens, productos
tropicales. (83-89)

The above reference pictures the bleak urban life of Avenue C to which Kinnell refers to initial C- Christ. It metaphorically presents that the myth of Christ is hopeless.

Besides despair and suffering, Kinnell floats the image of the cross:

From a rooftop a boy fishes at the sky,
Around him a flock of pigeons fountains,
Blown down and swirling up again seeking the sky.

A red kite wriggles like a tadpole
Into the sky beyond them, crosses
The sun, lays bare its own crossed skeleton.
(93-98)

In the reference mentioned above, the poet reverses the role of Christ. He came to earth as a fisherman, whereas Kinnell portrays the boy as a fisher of gods, dangling the bait of the red cross through the sky. Kinnell writes, "Fishes are nailed to the wood, / The fishmonger stand like Christ, nailing to the wood" (348-).

Near the end of the poem, Kinnell says that the new paradise is a new ghetto teeming with the "common poor" (473). The initial "C-change"

(472) echoes Ariel's song "The Tempest," in which Ariel tells Ferdinand that his father is dead and has changed by the sea into something rich and strange.

However, the "C-change" (472) of Kinnell's poem refers to the transformation of the world made by Christianity, especially about the Jews. Kinnell explains that people were so happy to be free from beliefs. The climax of the poem ends with people happiness that Christ is dead:

In the nighttime
Of the blood they are laughing and saying,
Our little lane, what a kingdom it was!
oi weih, oi weih. (487-490)

The above reference expresses happiness and freedom. People can laugh and say of this "God-forsaken Avenue" (469) and "Our little lane, what a kingdom it was!" (489). They were glad to free themselves from these Christian rules and beliefs. Therefore, Kinnell declares that Christian beliefs put people in a dilemma. He suggests that people live their lives according to their ideas rather than unknowingly following other religions.

Kinnell accepts suffering and death are facts of life. He explores the pain and suffering so that he can understand his death and Christ. The poem "Doppelganger" describes the beginning of the world. He writes:

I remember at day break
The air on the point of cooling
Was just starting to heat up,
I heard a voice in the distance,
I looked up, far away,
There at the beginning of the world
I could make out a beggar,
Down the long street he was calling Galway!
I started towards him and began calling
Galway! (13-18)

In the above reference, the beggar present from the beginning of the world echoes both Adam and Eve's fall and their consequent exile. It also reflects the New Testament adjuration that the poor will always be with us. Kinnell enters the poem to identify himself completely with the tradition of suffering "long street" (17) of human misery.

Therefore, Kinnell explores the myth of Christian as false. He believed in reality rather than following the ancestor's documented

beliefs. However, his perspective does not mean hurting others' sentiments, but his definition of the Christian religion.

Heaven

Kinnell does not believe in heaven; rather, he finds this earth as heaven. Nobody knows the existence of heaven and hell. It is just an assumption of human beings and their society. In the poem "Paradise Elsewhere," Kinnell describes people as "idiocy" (3) for hoping for heaven. The poet says that some older people became upset by thinking that death was near them, and others became curious about going to heaven. They fixed their mind that they "will have" (4) "heaven" (4). However, Kinnell writes that sickness and unhappiness can quickly fill the human mind with the idea of paradise:

"What about heaven?" I said to Harold, who is ninety-four and lives in the VA Hospital in Tucson.

He said, "Memory is heaven,"

The physicist emeritus tottering across the campus of Cal Tech through the hazy sunshine occasionally chuckles to himself. (5-9)

The above reference describes an older man Harold who is in Veterans Affairs Hospital, Tucson, America. Kinnell asked Harold about heaven, and he replied heaven is memory. Hearing Harold's view on heaven, the physicist chuckles to him.

The climax of the poem describes that "yet it happened to many others" (10); when sufferings and unhappiness hovers one's future, "the idea of paradise" (11) quickly fills their mind.

Kinnell does not believe in the existence of heaven; rather, and his view is to live life happily while living on earth.

Conclusion

Galway Kinnell is one of the great American poetry writers that contribute immense work to American literature. His poems contain several themes like nature, religion, death, politics, and death. But, the present paper studies Christian myths that the researchers have not yet discussed. Therefore, this paper will help future research to understand the Christian mythology in Kinnell's poetry.

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THE IMPACT OF ARMED CONFLICT ON EDUCATION IN KASHMIR**P.A. Ahmad¹ and S. Balamurgan²**

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¹Rahieamir786@gmail.com**ABSTRACT**

“The students have been the worst sufferers in Kashmir. Every other year, our Education and Schooling get Disrupted” Allow us to take a few examples from history, during the underlying long stretches of World War II when there was battle among Britain and Germany it was chosen the two fighting nations that spots like Oxford, Cambridge in Britain and Heidelberg, Gottingen in Germany ought to be kept unapproachable from battle as they are spots of schooling and they ought to be absolved from revile of battle as much harm to education was at that point done by Nazis besieging U.K. urban communities which harmed colleges like Liverpool, Manchester, Cardiff, Bristol, Newcastle and so forth To save our instructive arrangement we need to follow such examples from history. At the point when we talk about Kashmir, struggle unavoidably comes up. It influences each part of Kashmir, including education. With endless and relentless shutdowns, curfews, restrictions, and communication barricades, getting a legitimate education is really unsure. Regardless of whether one comes from a city or a village, goes to public schools or government schools, getting a quality education anyplace in Kashmir is a test in itself. The armed conflict set down falling consequences for students of Kashmir and has likewise been answerable for huge change to essential vital citizen framework. Furthermore, the obliteration and dread caused tangibly affects regular civilian life, especially for children. Truly, every region and each piece of the Kashmir society experience in total at the individual similarly as get-together level education was the major causality because of the conflict. The paper aims to focus on the impact of armed conflict on education in Kashmir.

Keywords: Armed conflict, Human Right Violation, Militarisation, Internet Barring, Enrolment in schools,

Research Objectives

1. Unmask the meaning and root cause of armed conflict In Kashmir.
2. To analyse the impact of Armed Conflict on education in Kashmir.

Literature review

	Authors	Paper Review
01	Shehryar (2018)	The Impact of Explosive violence on Students and Education In Kashmir
02	Asima Hassan (2020)	Impact of conflict situation on education in Kashmir, a sociological study
03	Joe McCarthy (2019)	Kashmir Crisis could upend education for Millions of Children
04	Anub Mannan (2020)	Education Paralysis In Kashmir: Need to protect The Future
05	Munazah Shakeel (2020)	Education In Kashmir Has been Disrupted who’s to Blame
06	Habibullah & Kumar Mishra(2021)	Trauma and Children: Exploring Posttraumatic growth among school Children impacted by armed Conflict in Kashmir

Introduction

Kashmir has been the focal point of conflict among India and Pakistan since the lines of parcel were attracted 1947. All things considered, there have been four conflicts between the two nations; in 1947-48, 1965, 1971, and in 1999. The latest of these saw more than 40,000 fighters and regular folks being killed. Other than these conflicts, both nuclear countries have been consistently at low-level

clash, with engagements breaking out consistently. (Kousnsar 2010)

Education is main structure squares of human advancement. It isn't only a fundamental right, yet an establishment for progress in different regions, including health, nutrition and the advancement of foundations and democracy. Conflict sabotages this establishment and furthermore adds to the fettle that nourishes brutality. Conflict obliterates instruction framework, lessens disburse on educational institutions and teachers and forestalls

children/youth from going to classes. Schools/universities are regularly an objective for bunches antagonistic to the government in light of the relationship with state authority. Struggle influences the educational chances of children/youth in a scope of various ways. There are three unique levels whereupon vicious struggle can impact education. (Shehryar 2018)

Firstly, it influences kids/youth straightforwardly through the deficiency of family members, physical violence, and rape; need to venture out from home and so forth.

Besides, the harm brought about by conflict can directly affect the chance of going to school/college, as far as the risk to arrive, and furthermore the financial circumstance may presently don't take into consideration them to pay for education.

Thirdly, educational foundation and establishments grew marks and obliterated – either inadvertently or for political senses. Schools/colleges can likewise be involved and utilized as bases for fighting groups. The schooling system in the valley was the expressive causality because of armed defiance and the mind-boggling state reaction to it. In mid-90s the quantity of schooling days got diminished to 80 from 220 of every 1989. The significant reason prompting the diminishing working days were episodes of violence and disintegrating of whole arrangement of governance. (Cervantes 2016)

Educational Arcadian in the valley give an exchanging perspective on its actual premise, gutted school buildings, Border security personnel's involved structure, and bunker encompassed structures, abandoned classrooms, strikes and demonstrations, replicating in examinations, evacuated science education because of movement of in excess of 10,000 Pure Science and arithmetic teachers to different spots in India. There has been a weighty reduction of structure, halting educational advancement in the region.

Extracurricular activities got hindered. The act of educational trades through sojourn of academician from outside the valley has additionally halted. Quality education turned into something uncommon and significant expense product. While education in educational institutions couldn't be completed

as expected, examinations turned into a sham mostly in light of carbon copying. All should be possible through firearm or cash. (Joe McCarthy 2019) A significant advancement in that circumstance was the substantial exit students in the primary and secondary stages and particularly in the provincial regions for financial and non-monetary (security) reasons. As per the 2011 statistics, 59.46 % literate population in valley. The total literacy rate of a nation for a similar period is 65.38 %. Jammu and Kashmir positions 33 among the states and Union Territories of India. However the literacy rate is a long ways behind the public normal and J&K is one of the ten educationally backward conditions of the country.

According to Economic Survey 2008-09, the State of J&K lingers a long ways behind in social area for example education, public fitness, sanitation, and social government assistance. The J&K remained at 4 most illiterate and educationally backward state. According to survey around 35 per cent from different stages of education in the towns needed to exit for reasons straightforwardly or by implication identified with militancy. Youths from upper and regular workers went in thousands for schooling to different bits of the country and the world.

Methodology

The current research has been confined to youth evaluated diverse degree universities covering the assets of general science, Humanities, and software engineering. The respondents were looked over the universities of five areas of Kashmir region of Jammu and Kashmir. The areas are (Anantnag, Ganderbal, Kupwara Pulwama and Shopian. The absolute example size was 500. The absolute number of 100 respondents was browsed every area dependent on separated irregular testing. The decision of the schools was totally founded on the circumstance with instructive establishment to the extent tremendous enrolment of understudies, courses and workplaces available, and so on for a perception of the understudies' inclination and the perspective on youth concerning the situation, the scientist used survey and meeting methods for assortment of information. To ensure a delegate response, the factors, for instance, age, sex, instructive

capability, subjects and family pay were kept into thought. Every one of the factors was picked purposely to offer depiction to all concerned social events in the sample.

Findings of the Study

We inquired from our respondents, regardless of whether their education experienced throughout the last a long time as far as their attendance, quality and facilities, our respondents set forth their responses as referenced underneath.

Discussion

In numerous spaces, the consistent violence or threat of violence has additionally prompted the issues with psychological well-being, just as student's intellectual development and physical growth. The students in Kashmir were observed to be over two times as prone to experience the ill effects of poor mental and enthusiastic wellbeing as those in other states of India. Armed conflict effectively affects human resources development and the aggregation of education. Conflict prompts the annihilation of school foundation and relocation or passing of students and education administrators. Schools and spots of learning are frequently unequivocal focuses during times of armed conflict. For children who do go to school, conflict can negatively affect educational attainment, expanding drop-out and decreasing educational endurance rates because of uprooting, military recruitment or monetary difficulty. Conflict in the school climate can effectively affect the academic environment, including influencing the confidence of educators, the speed at which they work, and expanding absenteeism.

Damage to schools

Shelling along the line of control among Pakistan and India has caused significant disturbances in education for the two nations. In 2014, weighty shelling by Indian powers on the Sialkot line towns in Charrwar area caused 125 government schools to close, and caused uplifted degrees of dread and trouble for nearby networks. Further distress in 2016 prompted the conclusion of almost 350 schools in Indian towns of Jammu, Samba and Katthua regions, which are arranged inside 2.6 km of the border. The request came after

there was substantial shelling by Pakistani powers in the space prompting the deaths of 16 civilians. (Khan 2019)

On the November twelfth 2016, mortar fire by Indian soldiers obliterated many houses and schools in the Nakkyal and Baittal area of Azad Jammu and Kashmir (AJK). This prompted the quick conclusion of 26 young ladies' and 35 young men's schools in the Nakayal area. On December sixteenth 2016, a school bus was hit by shelling, killing the driver and wounding eight children. On the July 26th 2017, a school building in Poonch was vigorously harmed because of shelling by Pakistan. The week prior to, 26 schools shut due to ceasefire violations. Further interruptions in securing education have likewise been exacerbated by syllabus curtailment, mass copying, permissive checking and absence of teacher accountability – all connected to the prolonged shutdowns.

Disruptions

The closures and violence seen in schools has prompted understudy uprisings and protests, as Kashmir students see their education put in danger and being mobilized. In April 2017, many students from Amar Singh College drove a dissent against Indian powers. Soldiers then, at that point, utilized tear gas and pellets on the students. No less than 75 school students were wounded, with many enduring pellet wounds to their eyes. A concentrate by Chinar International in 2016 tracked down a profound feeling of negativity with respect to education as far as quality and result. The proceeded violence across the district has caused numerous schools to go dismissed. This has left some school buildings in Kashmir left without legitimate sanitation facilities, water and boundary walls. The present circumstance has kept on declining. (Anub Mannan 2020) Close by the expanded levels in shelling: admittance to a limit divider fell by 14% for middle schools in the state somewhere in the range of 2014 and 2019; the accessibility of toilets for students of secondary and higher education additionally deteriorated; and the quantities of understudies per classroom likewise expanded vigorously in a similar time period, as

students moved to schools where they were less presented to impacts from hazardous violence.

Quality of learning

In Indian occupied Jammu and Kashmir in 2016, schooling for the year was just directed for an aggregate of four months. Many classes had learnt under 40% of the curriculum for the year. Quite a bit of this harm to tuition was considered 'irreparable'. Perceiving the deficiency of education because of these school closures and the weighty interruption to education, the Indian government eventually felt it important to loosen up term two examinations from classes first to eighth. This deficiency of learning can affect students' future possibilities concerning occupations and income. The degree of the harm could be adverse to the eventual fate of an entire generation. Notwithstanding, it is not just the closures alone that impact students. (Hassan, A. 2012)

Militarisation

On the two sides of the contested border, regions encompassing schools and other populated regions have become progressively mobilized, with military camps frequently discovered near school structures and grounds. The militarization of these spaces can prompt a negative psychological sway on children which can cause higher dropout rates and has surely been the situation in Indian occupied Kashmir valley where numerous children feel terrified of the school's nearness to military camps. (Munazah Shakeel 2020) A research study led by the Working Group on Peace, Conflict and Education at Colombia University in 2016, tracked down that 85% of the military camps were a good ways off of under km of the schools analysed. A portion of these schools even shared normal borders with the camps. The children in these schools were accounted for to feel compromised and terrified while within the sight of the military personnel and because of the closeness of the camps that was probably going to be focuses of explosive weapons. The children realize that this closeness puts them at more serious danger of shelling.

Impact on girls

The hazardous violence in the locale furthermore affects girls, which has had an adverse consequence many parents see an expanded danger for their daughters, when schools in regions have encountered shelling. In 2018-2019 there were 398,525 girls tried out education inside metropolitan regions. This figure tumbled to 99,899 young ladies in 2015-16, adding up to 78% decrease in girls in education. (Fatima. Et.al 2016) .The closeness of military camps additionally puts girls in expanded risks, with the presence of armed force personnel meaning girls are more in danger of sexual violence, misuse and different types of harassment. This prompts a further ascent in the dropout rates in these schools for girls as they look to keep away from this.

Virtual Curfew after Abrogation of Article 370

The internet is becoming town square of the global village of tomorrow. We as a whole are presently associated by the internet, as neurons in a giant brain. The level of citizens is relied upon to increment. After the abrogation of article 370 most schools, colleges, universities have been temporarily closed to keep law and control in the territory. The Internet has been obstructed after the repeal of article 370. The internet barring made the students poor to accomplish educational aims. Truth be told, the respondent's shared their perspectives that they couldn't set themselves up for various competitive tests because of absence of internet. They said that how India will accomplish Digital India Plan of making the internet accessible to everyone on the off chance that we control admittance to it in certain pieces of the country. In the present time, admittance to internet is a democratic right and it ought not to be detracted from citizens on the affection of law and order. (Bhat, N. A 2020).

Conclusion

Education accepts a fundamental part in Kashmir society in every individual's bubbly energy since it withstands for individual

increase, stronghold, information on climate and openings for financial improvement. It is an aftereffect of education, examination and application that society in Kashmir has progressed the way where it has and it is the shortfall of education that potentially is obligated for a significant long time spots for Youth. The education in Kashmir suffered absolutely because of the contention. While assessing the impact on education of youth, it has come to front that this point has been tremendously affected because of contention Repeat that education matters and its amazing use can break the custom of violence and question. Discontinuities in education are unfriendly to psycho-social, enthusiastic and intellectual turn of events and proficiency of the kid. As we fight to meet the thousand year's advancement objectives in training, the impact of contention on instruction and learning should be of basic concern. We need to find methods of giving our children a free from any and all harm learning climate in every situation especially during periods of contention.

A principle need for both governments ought to guarantee safe admittance to education, close by the de-heightening of the conflict and the forbidding of mortar usage. The two India and Pakistan ought to resolve to guarantee such

regions stay safe, and ought to underwrite the Safe Schools Declaration that means to see schools and children ensured during seasons of conflict. As a feature of these endeavours, India and Pakistan should quit utilizing untargeted explosive weapons and those with wide-region impacts in regions where civilians are presumably going to be among the casualties, for example, close schools. This would essentially diminish the effect of such violence on schools and schooling, permitting children to get back to their studies, realizing that the schools are a position of security.

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SUSTAINABILITY REPORTING PRACTICES OF THE SAMPLE INDIAN COMPANIES BASED ON GRI-G4 GUIDELINES

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ABSTRACT

The basic purpose of this paper is to measure the sustainability reporting performance of the selected companies from across six sectors based on their level of disclosures as per GRI-G4 guidelines. The present study employs content analysis technique to examine the level of sustainability disclosure based on GRI-G4 reporting framework by selected companies. A binary coding system is used to measure the level of corporate sustainability reporting (CSR), i.e. '1' if the item is disclosed or '0' otherwise. Reporting companies inform their stakeholders in understanding the company's contribution to sustainable development through their reports. Potential investors make better informed decision in selection of companies or industries for investment purpose.

Keywords – Economic, Environment, Social, Governance, GRI-Framework

1.0 Introduction

Corporate sustainability reporting has its root in environmental reporting and it is basically considered as an extension of it. The environmental reports were published initially in the late 1980s by companies in the chemical industry to overcome serious image problems. The other group of early reporters of sustainability reporting was a group of committed small and medium sized enterprises (SMEs) with very advanced environmental management systems. Furthermore, the tobacco industry soon followed sustainability reporting practices in the corporate world to attract new investors when ethical investing was becoming increasingly popular. Corporate sustainability reporting practices or non-financial disclosures is now getting more popular over last decade. All MNCs are publishing sustainability reports separately in addition to their financial report every year. Going little further, some companies have been publishing financial reports along with sustainability report altogether i.e. known as integrated reporting. As there is an increased demand from the stakeholders of the company, the companies across the globe have started reporting on sustainability aspects. It improves transparency in internal process and directly communicates with stakeholders and potential investors. Sustainability performance of an organisation can be improved by measuring, disclosing, monitoring and reporting that help to have positive impact on environment, economy and society. Global Reporting Initiative (GRI) has developed so many sustainability reporting

guide lines such as G1, G2, G3, G3.1 and latest G4 [1]. That enable all the organisation to prepare their sustainability report in one common format that become key drivers for the quality of sustainability reports. There is more guide line apart from GRI guidelines such as United Nation Global Compact (UNGC), Suitability Accounting Standard Board (SASB), and International Integrated Reporting Council (IIRC). But GRI has more number of parameter as compared to others [2]. There has been a growing demand by investors for information on both financial and non-financial activities of the companies along with information relating to overall sustainability in capital markets for their investment decisions. The drivers of this demand could be corporate specific factors or general contextual factors. But, the fundamental drivers of sustainability reporting are considered to be the maximization of shareholder wealth, preservation of organisational legitimacy, management of corporate risk to reputation.

1.1 GRI-G4 Framework-A Brief Introduction: The Global Reporting Initiative (GRI) is a multi-stakeholder, multi-national reporting framework is accepted internationally is also known as corporate sustainability reporting (CSR) or business sustainability reporting or triple bottom line (TBL) reporting. G4 is the latest guidelines used by most of the corporations internationally. GRI-G4 framework has 4 categories Governance, Economic, Environment, and social. Governance category has 7 aspects with 56 indicators, Economic category has 4 aspects

with 9 indicators, Environment category has 12 aspects with 9 indicators and Social category has 29 aspects with 48 indicators. In totality, there are 52 aspects with 149 indicators.

1.2 Indian Perspective

In July 2011, Indian Government Ministry of Corporate Affairs issued National Voluntary Guidelines (NVG) on Social, Economic and Environmental Responsibilities of Business. All Indian Companies either MNCs or SMEs got principles and outline of corporate responsibility reporting on the basis of these guidelines. The reporting scenario in India is still in nascent stage with nearly 142 companies disclosing their sustainability performance. TATA (Automotive) is pioneer in sustainability reporting in India. It has started reporting their sustainability performance from year 2001 based on GRI guidelines. A Circular issued by the Securities and Exchange Board of India (SEBI) on 13 August 2012 which is mandatory for all top 100 listed companies based on market capitalization at BSE & NSE as on March 31, 2012 to practice National Voluntary Guidelines to uniformly disclose Business Responsibility Reports along with Annual Reports. It came into effect from financial year ending on or after 31 December 2012 [3].

The rest of the paper is presented in six sections. The review of literatures is presented second section. Third section is devoted for Material and Methods of the study. Fourth section explains results & discussion. Conclusion and recommendation is presented in fifth section. Finally, the implications for future research & limitation is presented in sixth section.

2.0 Literature Review

For the last two decades, researchers across the globe have been emphasizing on the publication of sustainability report by corporates. Some researchers have focused their research on frequency of reporting on different parameters of sustainability, while others have used qualitative assessment techniques to provide an insight into sustainability reporting practices by corporates. Some literatures found that the governance disclosure was the highest and environmental

disclosure the least in the overall ESG disclosure [4]. The researcher also found that ESG disclosure practices were prejudiced by auditor type and not by company size and profitability. It has also been reported in some of the studies that the companies report the positive aspects of sustainability and conceal the negative aspects [5]. Bradford examined the level of understanding by external parties regarding sustainability reporting activities done by companies and it was observed that sustainability reporting from company to company and industry to industry differs [6]. Companies with large size and number of years of operation have positive sustainability disclosure. But, company's profits, leverage, growth and advertising intensity have negative sustainability disclosure [7]. Contrastingly, employing content analysis technique based on GRI-G4 framework with a sample of 10 PSU banks found that sustainability reporting disclosure and transparency practices are not being properly followed by most of these banks [8].

Jain & Winner examined corporate sustainability reporting of 200 largest state-owned and private Indian companies and found that most of the companies show commitment towards environment but only few companies report their environment impacts in accordance with GRI framework [9]. A comparative study between developed and developing economies based on sustainability reporting through content analysis technique by Bhatia & Tuli observed disclosure by developing nation to be more as compared to developed nation [10]. Whereas in another study by Abeydeera in a particular national context revealed that global institutions dominate sustainability reporting in comparison to their local counterparts and thereby limit the potential of local institutions reporting to transform business as usual [11]. Sustainability reporting is an impression management tactics that organisations used to improve the image of an organisation [12]. To gain a new insights with respect to stakeholder, corporate governance and corporate legitimacy, the MNCs of Austria, UK and South African experienced reporting outcomes to be very important for policy implications to the companies, investors, regulators and stakeholders [13].

3.0 Materials And Methods

3.1 Study Design & Analytical Framework

Content Analysis technique is used in this study for “extracting information in a numeric form from the sustainability reports of the companies”. There is “plethora of studies in social science where instances of content analysis techniques have been used. The present study has used content analysis to examine the level of the sustainability disclosure”. As majority of the “Indian companies follow GRI-G4 guidelines for publishing their sustainability report, the GRI-G4 reporting framework is found more appropriate for calculating the disclosure score”. A binary coding system is “used to measure the level of corporate sustainability reporting (CSR), i.e. ‘1’ if the aspect is disclosed or ‘0’ otherwise”. Total 12 companies from across six sectors have been considered which have been reporting on sustainability dimensions as per the GRI guidelines at least for a period of 10 years”. The selected firms cover a broad spectrum of sectors, which influencing most our environment, economy and society are IT Services, Oil and Gas, Steel, Cement, Automobiles, Manufacturing etc. Sustainability reports are collected from the sustainability disclosure database (www.database.globalreporting.org) from 2014 to 2018 because GRI-G4 Guidelines published in 2013. The sampling method adopted for this study is purposive.

3.2 Scope of the Study

This paper measure the sustainability reporting performance of the select companies from across six sectors based on their sustainability disclosures. The study analyses data of five years spanning from 2014 to 2018. The variables of sustainability reporting are level of disclosure on government, social, economic and environmental dimensions.

3.3 Construction of Decision Matrix

Decision Matrix (DM) is prepared by followings the binary coding system based on sustainability disclosures by these companies on governance, economic, environment and social dimensions. Scores of each category and companies are added. For example, five years data of category governance is shown in *Fig.2*. In IT sectors, two companies Infosys and TCS and their governance disclosures year-wise (from 2014 to 2018) are such as 4, 7, 7, 7, 7 and 4, 4, 4, 7, 7 respectively. Its sum total are 32 and 26 respectively. Similarly, the researcher calculated the score of other remaining companies (*Refer Table-1*). The reason behind taking aspects for calculating scores instead of indicators is that its cover broad view of sustainability reports published by companies. So, it was more appropriate to consider aspects instead of indicators for calculation of sustainability disclosure score.

Table 1: Decision Matrix (DM)

Sector	Companies	Governance	Economic	Environment	Social
Automobiles	Mahindra	29	11	37	73
	Maruti	32	11	48	94
Cement	ACC	35	18	46	100
	Ultra Tech	26	11	32	53
Conglomerate	ITC	34	15	44	95
	RIL	28	17	38	95
IT	INFOSYS	32	10	36	104
	TCS	26	12	47	85
Manufacturing	SAIL	31	12	38	64
	TATA Steel	29	15	50	115
Oil & Gas	IOC	32	17	50	123
	ONGC	27	13	39	84
	sum	361	162	505	1085

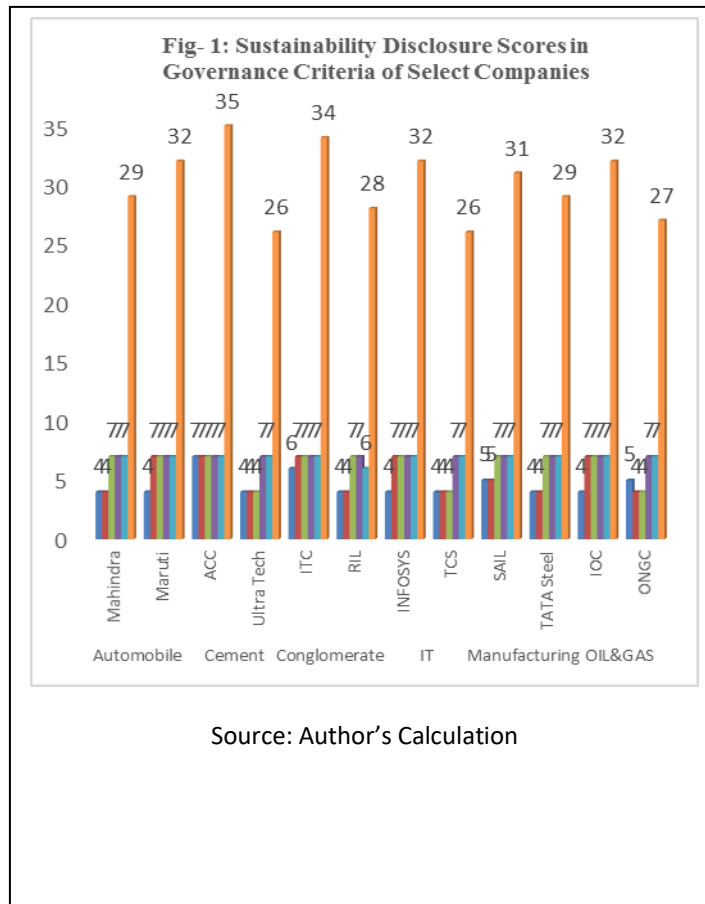
Source: Author's Calculation

4.0 Results and Discussions

4.1 Analysis of Performance of Select Companies based on Sustainability Disclosure Scores

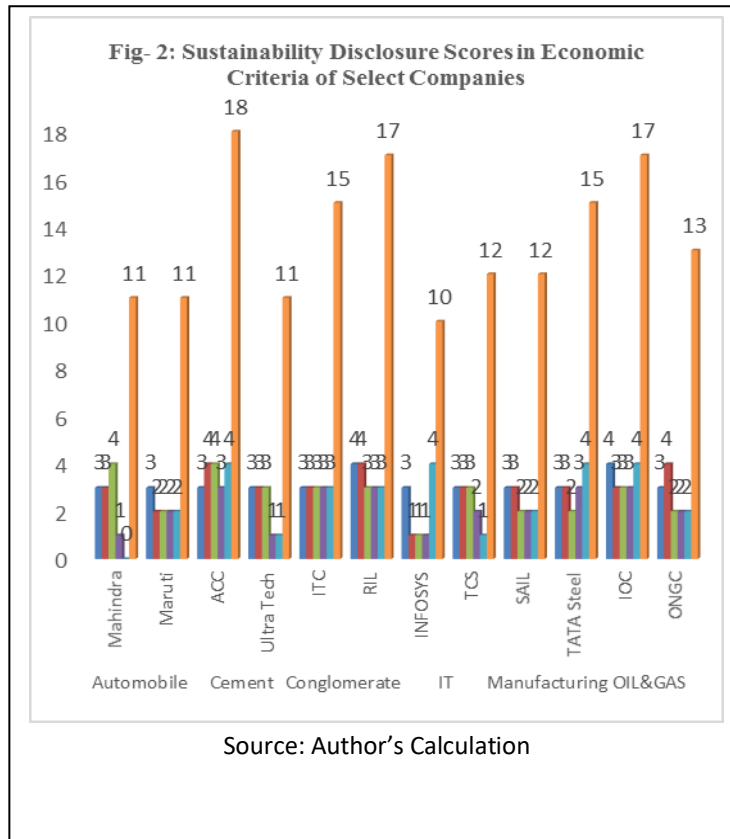
The year-wise sustainability disclosure scores with respect to governance criteria of select

companies is presented in *Fig-1*. The disclosure of governance parameters in sustainability reporting is “essential for the continuous operation for any corporation and therefore much attention is given to these concepts and their applications”.



Through sustainability disclosures, “organizations are demonstrating their sustainability governance performance. The governance aspects include strategy and analysis, organizational profile, material aspects and boundaries, stakeholder engagement, report profile, ethics and integrity”. These are seven aspects of disclosures under governance category. A perusal of data presented above revealed that ACC is performing consistently over the years

with respect to governance disclosure, which is closely followed by ITC, Maruti, IOC and SAIL respectively. But it is interesting to note that RIL has not been consistent over the year with respect to governance disclosure which is evident from its disclosure in 2018. Further, it is found that Ultratech and ONGC being poor performers in overall governance disclosure criteria in comparison to other selected companies.

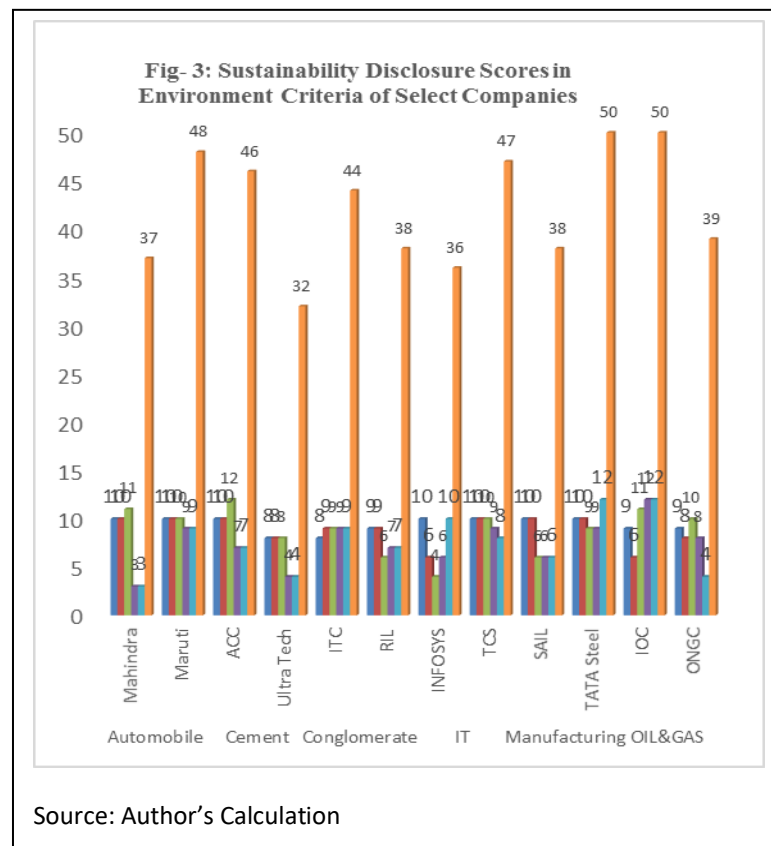


The year-wise sustainability disclosure scores with respect to economic criteria of select companies are presented in **Fig-2**. Reporting on economic criteria basically help the stakeholders to have a clear cut idea about the reporting company’s “potential competitive capital resources and level of risk. The disclosure of these aspects can endorse the company’s contribution to the economics development of local communities. This disclosure report is seen as a positive action by the company to maintain trust and good relations with investors and creditors to remain invested in the company. The economic aspects include economic performance, market presence, indirect economic impacts and procurement practices”. These are four aspects of economic category disclosures.

Through sustainability disclosures, organizations are demonstrating their

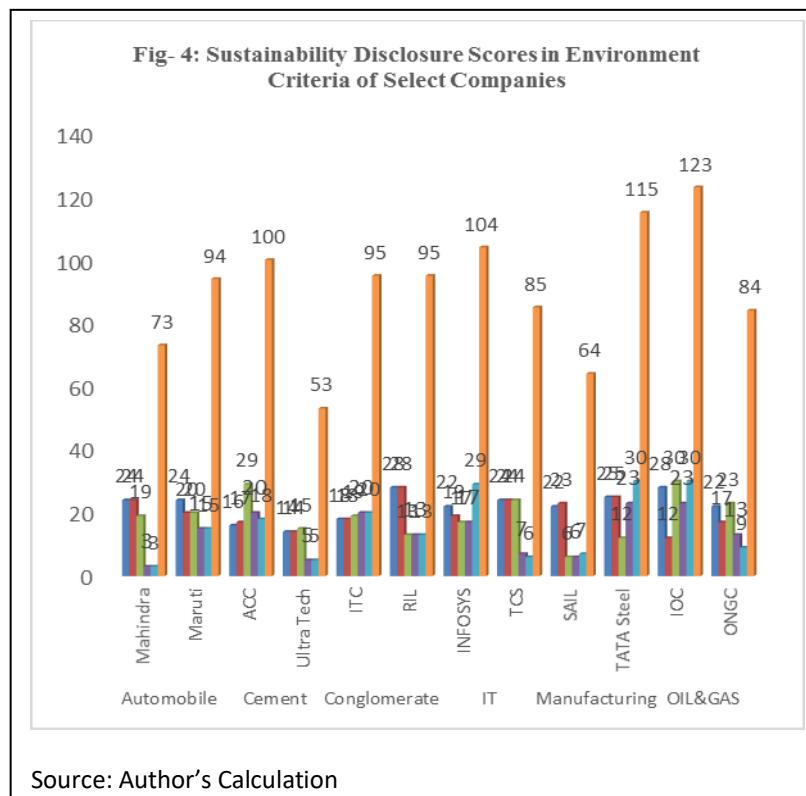
sustainability governance performance. The governance aspects include strategy and analysis, organizational profile, material aspects and boundaries, stakeholder engagement, report profile, ethics and integrity. These are seven aspects of disclosures under governance category.

A perusal of data presented above revealed that ACC is performing consistently over the years with respect to governance disclosure, which is closely followed by ITC, Maruti, IOC and SAIL respectively. But it is interesting to note that RIL has not been consistent over the year with respect to governance disclosure which is evident from its disclosure in 2018. Further, it is found that Ultratech and ONGC being poor performers in overall governance disclosure criteria in comparison to other selected companies.



The year-wise sustainability disclosure scores with respect to environmental criteria of select companies are presented in **Fig-3**. Reporting on environment category help the stakeholders to understand the “possible impacts associated with the inputs (such as energy and water) and outputs (such as emissions, effluent and waste). The management of the company is required to prevent, minimize, and repair the damage as a form of concern and responsibility to the environment. Transparency in reporting in these dimensions will make stakeholders know and understand the things of what has been done as a form of concern and responsibility to the environment, which, in turn, will receive recognition and support from its stakeholders, so that the company’s business operations will run more smoothly”. There are twelve aspects in environment categories of disclosures. A perusal of data presented in the data-table revealed that Tata Steel & IOC are performing well over the years with respect to environment

disclosure, which is closely followed by Maruti, TCS, ACC and ITC respectively. But consistency in environmental disclosure pattern over the years is seen only in IOC. On the contrary, there has been a decline in disclosure on environmental aspect by companies belonging to automobile sector, cement sector, steel sector and IT sector in general. Further, it is found that Ultratech, Mahindra, Ultratech, Mahindra, Infosys and SAIL being poor performers in overall environment disclosure criteria in comparison to other selected companies. Performance of sustainability disclosure on environment criteria of 12 companies from top are as following TATA Steel & IOC, Maruti, TCS, ACC, ITC, ONGC, RIL & SAIL, Mahindra, Infosys, Ultra Tech respectively. Performance of sustainability disclosure on environment criteria of 6 industries on same criteria from top are OIL & GAS, Manufacturing, Automobile, IT, Conglomerate, Cement respectively.



The year-wise sustainability disclosure scores with respect to social criteria of select companies are presented in **Fig-4**. Reporting on social criteria, the company shows an intent to support many social issues concerning international organization. “Social responsibility is not only for external, but also internal stakeholders. Paying attention to employee health and safety, equality of opportunity in competition between male and female employees and human rights aspects are the responsibilities of the internal stakeholders whereas promoting anti-corruption policies, anti-competitive and monopolistic practices, and labeling products for the health and safety of customers are concerns of external stakeholders”. There are twenty-nine aspects in social category of disclosures.

A perusal of data presented in the table revealed that IOC, Tata Steel & Infosys are performing considerably well over the years with respect to social disclosure, which is closely followed by ACC, ITC, RIL and Maruti respectively. But consistency in social disclosure pattern over the years is seen only in Tata Steel. On the contrary, there has been a decline in disclosure on social category by companies belonging to automobile sector, cement sector, conglomerate, IT and Oil & Gas

sector in general. In manufacturing sector, SAIL’s performance found to be miserable. Performance of sustainability disclosure of 12 companies on social criteria from top are IOC, TATA Steel, Infosys, ACC, ITC & RIL, Maruti, TCS, ONGC, Mahindra, SAIL, Ultra Tech respectively. Performance of sustainability disclosure of 6 industries on same criteria from top are OIL&GAS, Conglomerate, IT, Manufacturing, Automobile, Cement respectively.

5.0 Conclusion & Recommendation

The purpose of this paper was to measure the sustainability reporting performance of the selected companies based on their level of disclosures from across six sectors and so that potential stakeholders can have more information apart from financial information for effective decision making. Now-a-days sustainability is a major challenge for all the companies. Profit making companies have main objective of maximizing shareholders’ wealth at any cost to survive in the industries. In their endeavor to maximize wealth, companies make damages to our environment and society. Now stakeholders are more aware about the climate change and impact of product on society. So, potential stakeholders are more

interested to know the performance of sustainability disclosures along with financial performance of a company's prior to being a part of that organisation. In this aspect, this study is important for the potential stakeholders for comparing performance of sustainability disclosures of the companies belonging to six major sectors in India. Performance of sustainability disclosures of select companies comprising of six sectors such as IT, Manufacturing, Automobile, Cement, Conglomerate, and Oil & Gas have been measured based on GRI framework. Therefore, it is recommended to the policy makers and regulatory authorities to make it mandatory for all organization to disclose their sustainability report annually, so that stakeholders can get more information about the organisation apart from financial information. This will not help the investors and supplier to take a call on their association with the companies but also to

other stakeholders for effective decision making.

6.0 Implications For Future Research & Limitation

The practical implication of this study is that is that the company must pay attention to the importance of social, economics, and environmental disclosure in the sustainability report. Stakeholders have started paying more attention to such disclosure, and they judge to give "value good image". A good image is what helps improve the performance of the company performance. The sample size is small while composing the sector i.e. industry, which is the limitation of this study. Only two companies are taken by the researcher from each sector in this study and total number of sectors is six. So, further study can be done by increasing the number of companies in each sector and number of sectors.

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Abbreviation

MCDM-Multi-Criteria Decision Matrix,	IT- Information Technology,
WNDM- Weighted Normalize Decision Matrix	Gov- Governance
TOPSIS- Technique for Order Preference by Similarity to Ideal Solution,	RIL- Reliance Industries Limited, Eco-Economic
SOS – Square of Sum	IOC-India Oil Corporation,
SRSOS- Square Root of Square of Sum	ITC-Imperial Tobacco Company, Env-Environment
Soc- Social	SAIL-Steel Authority of India Limited,
TCS-TATA Consultancy Services,	ACC-Associated Cement Company,
WCED- World Commission on Environment and Development	UNGC- United Nations Global Compact
ONGC-Oil and Natural Gas Corporation,	BIS- Best Ideal Solution,
GRI- Global Reporting Initiative	OECD -Organization for Economic Co-operation and Development
BL-Triple-Bottom Line	WIS- Worst Ideal Solution,
DM- Decision Matrix	
NDM- Normalize Decision Matrix	

FACIAL EXPRESSION RECOGNITION WITH DEEP LEARNING**A. Malhotra¹, M. Gupta², A. Bhalla³, A. Beri⁴ and Deepak⁵**^{1,3,4,5}Department of Information Technology, Netaji Subhas University of Technology²Department of Computer Science, Mata Sundri College For Women, University of Delhi¹uppalz_amar@yahoo.com, ²meghabis@gmail.com, ³arjunbhalla28@yahoo.com, ⁴anmol.beri@gmail.com,⁵deepak.it.17@nsit.net.in**ABSTRACT**

A Facial expression is the visible manifestation of the affective state, cognitive activity, intention, personality and psychopathology of a person and plays a communicative role in interpersonal relations. Emotions are considered as the mediator and facilitator of interaction in this living world. Researchers have suggested that a whopping 65% of information in a spoken message originates from facial expressions and a mere of 9% through words and rest by the tone of speech. This clearly indicates the importance of visual component over the oral component which is even more important when we consider the case of understanding a message. This human ability makes us able to detect, recognize and understand social interactions with the help of facial expressions. This ability not only makes us aware of the current emotional state but also grants us with a hidden potential to allow the percipient to recognize conversational hints such as level of interest, level of understanding, speaking turns etc. With the advent of Deep Learning and Neural Networks our aspirations knew no bounds. The progress in the recent years have been revolutionary and is considered to exponentially ever-increasing. Despite much anticipated success, identifying facial expressions with absolute accurateness and within a limited time-frame is still a major challenge due to the complexity and variations of facial expressions. This paper presents an intelligent system for facial image-based expression classification using committee neural networks.

Keywords—Facial Expression Recognition (FER), Kernelized Dense Layer, Deep Learning, CNN, Rectified Linear Unit (ReLU)

1. Introduction

“Smiles are probably the most underrated facial expressions, much more complicated than most people realize. There are dozens of smiles, each differing in appearance and in the message expressed.” -Paul Ekman.

Facial expressions are important in facilitating human communication and interactions. Also, they are used as an important tool in behavioral studies and in medical rehabilitation. Facial image-based mood detection techniques may provide a fast and practical approach for non-invasive mood detection. The purpose of the present study was to develop an intelligent system for facial image-based expression classification using committee neural networks. Human emotions and intentions are expressed through facial expressions and deriving an efficient and effective feature is the fundamental component of facial expression system. Face recognition is important for the interpretation of facial expressions in applications such as intelligent, man-machine interface and communication, intelligent visual surveillance, teleconference and real-time animation from live motion images.

Facial expression plays an important role in smooth communication among individuals.

Facial Expression Recognition (FER)[17] is a technology used for identification of human behavior based on facial expressions. The extraction and recognition of facial expressions has been the topic of choice of many researchers in the recent years. FER is mainly applied to enable smooth interaction between computers and their users as an attempt to give computers the ability to recognize the emotion of the user and offer advices in response to the mood of the user.

The Facial Recognition System (FER) which majorly aims to classify human emotions as per the classification suggested by Paul Ekman, a Jewish American psychologist [1] who is considered to be a pioneer and is considered to have brought up a revolution in the stream of facial expression recognition.

The system becoming popular day by day due its various applications in many fields like healthcare, security, human computer interface any infinitely more. Typically, specific expressions are characterized by some core characteristics, like for instance a smile or an upward movement of corner of lips is usually associated with happiness. Research into automatic recognition of facial expressions addresses the problems surrounding the

representation and categorization of static or dynamic characteristics of these deformations of face pigmentation. Most of the models in this field are limited to basic expressions like Joy, Anger, Disgust, Fear, Surprise and Neutral. In facial expression recognition it is vital to take into consideration factors like configuration of the face, orientation, location, lighting and many other environmental factors. It has often been said that the eyes are the "*window to the soul*." This statement may be carried to a logical assumption that not only the eyes but the entire face may reflect the "*hidden*" emotions of the individual. Darwin's research on facial expressions has had a major impact on the field in many areas; foremost, his belief that the primary emotions conveyed by the face are universal [2]. Darwin placed considerable emphasis on the analysis of the action of different muscle groups in assessing expression.

The research on the statement of Darwin was done by Ekman and Friesen[1]. They hypothesized that the universals of facial expression are to be found in the relationship between distinctive patterns of the facial muscles and particular emotions (Happiness, Sadness, Anger, Fear, Surprise, Disgust and Interest). They suggested that cultural differences would be seen in some of the stimuli, which through learning become established as elicitors of particular emotions, in the rules for controlling facial behavior in particular social settings, and in many of the consequences of emotional arousal. Many factors impinge upon the ability of an individual to identify emotional expression. Social factors, such as deception, and display rules, affect one's perception of another's emotional state. Therefore, there is a need to develop Face Expression Recognition System (FERS).

The use of machines in society has increased widely in the last decades. Nowadays, machines are used in many different industries. As their exposure with humans increase, the interaction also has to become smoother and more natural. In order to achieve this, machines have to be provided with a capability that let them understand the surrounding environment specially, the intentions of a human being. When machines are referred, this term

comprises to computers and robots. A distinction between both is that robots involve interaction abilities into a more advanced extent since their design involves some degree of autonomy.

Affective computing claims that emotion detection is necessary for machines to better serve their purpose. For example, the use of robots in areas such as elderly care or as porters in hospitals demands a deep understanding of the environment. Facial emotions deliver information about the subject's inner state. If a machine is able to obtain a sequence of facial images, then the use of deep learning techniques [2] would help machines to be aware of their *interlocutor's mood*. In this context, deep learning has the potential to become a key factor to build better interaction between humans and machines, while providing machines with some kind of self-awareness about its human peers, and how to improve its communication with natural intelligence.

Introduction of Convolutional Neural Networks (CNN) has made things simpler for the researchers working in the field of computer vision and specifically, image classification. CNN is a deep neural network which was originally designed for the analysis of image. Many researchers used CNN for the same problem of facial expression recognition and they showed that CNN is far better as an approach to this problem. They can achieve high accuracy and can give better results. In our project also, we are going to use a CNN but with slight modification, we will use Kernelized Dense Layer in place of Fully Connected Layer. [3]

2. Motivation

Considered an archetypal masterpiece of the Italian Renaissance, painted by Leonardo da Vinci "The Mona Lisa". The ambiguity of her expression, often described as enigmatic, is maybe due to her slightly bemused smile. A slight smile that suggests that she may be holding back a secret as shown in Fig 1.

Here the researches sense an *optical illusion* [4] behind the interpretation of her smile by our brain. Going into the minute details we find that your peripheral vision reads dark shadows painted near the mouth and also the big shadow

over the left eye which somewhat resembles to the shadow around the mouth, gives a pronounced idea of a smile. In contrasting nature, the darkness around the upper-lips reduces the intensity of the smile. Its things like this, combined with the many other overactive imaginations that have contributed to the continuing fascination of the work. When Facial Encoding reads her emotion, no such conflict arises; it clearly tells us that Leonardo painted an expressionless face. Perhaps it's the lack of expression that gives this image its spirit of wonder. Often, her mouth is often tweaked to tease out a stronger smirk, as if compelled to add expression to what is an exceptionally neutral face. Perhaps da Vinci had purposefully avoided that emotional contagion between artist and muse? It's also possible that Mona Lisa had just about enough of smiling for hours on end and da Vinci has managed to capture those changes in emotion

perfectly - a sort of mashup of emotions which causes one to re-read the face over and over. Our motivation also involves factors such as benefits of Facial Expression Recognition System in the field of healthcare. Facial expressions convey very substantial information which is critical in many aspects of daily life. These help medical practitioners identify severity of the disease and some vital stats about the patients. Many different face components give a conclusive evidence of a particular health state by working synchronously in harmony. Specific disease like *Alzheimer's disease* in which patient loses his substantial cognitive capacity and even in some cases their verbal communication ability, facial expressions are the sole criterion left in such scenarios. Like Alzheimer's many other applications in healthcare take advantage of the FER and Image Processing to serve the patients with best possible care.

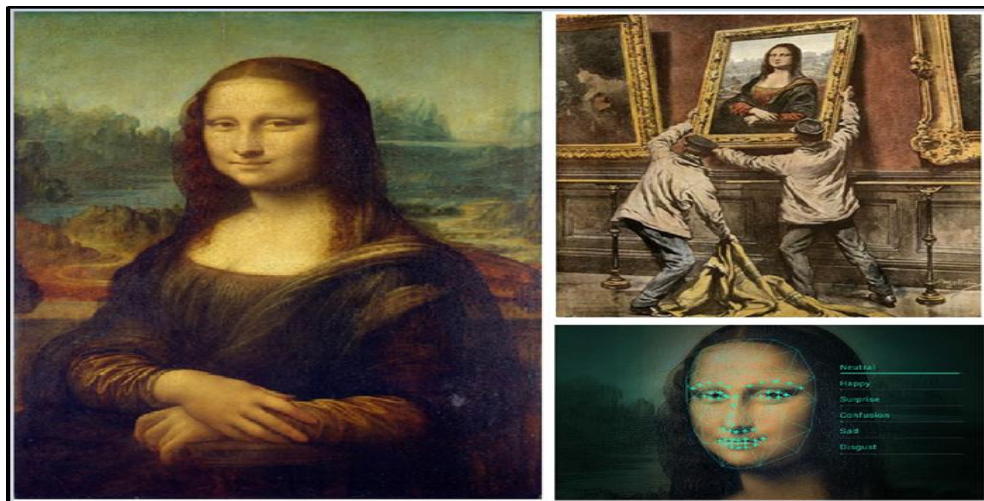


Figure 1: Mona Lisa's Smile in The Mind

Alt text for Figure 1[13 words]: Due to Mona Lisa bemused smile, there is ambiguity in reading her expressions.

3. Literature Review

Research in the fields of face detection and tracking has been very active and there is exhaustive literature available on the same. The major challenge that the researchers face is the non-availability of spontaneous expression data. Capturing spontaneous expressions on images and video is one of the biggest challenges ahead. Many attempts have been made to recognize facial expressions. Zhang et al investigated two types of features, the

geometry-based features and Gabor wavelets-based features, for facial expression recognition. Appearance based methods, feature invariant methods, knowledge-based methods, Template based methods are the face detection strategies whereas *Local Binary Pattern* [5], phase correlation, HAAR classifier [2], AdaBoost [2], Gabor Wavelet are the expression detection strategies in related field [6]. Face reader is the premier for automatic analysis of facial expression recognition and Emotient, Affectiva, Karios[7] etc are some of the API's for expression recognition. Automatic facial expression recognition

includes two vital aspects: facial feature representation and classifier problem

We will compare algorithms and the feature extraction techniques from different papers. The human emotion dataset can be a very good example to study the robustness and nature of classification algorithms and how they perform for different types of dataset. Usually, before extraction of features for emotion detection, face detection algorithms are applied on the image or the captured frame.

We can generalize the emotion detection steps as follows, shown in Fig 2:

- 1) Dataset Pre-Processing
- 2) Face Detection
- 3) Feature Extraction
- 4) Classification based on the features

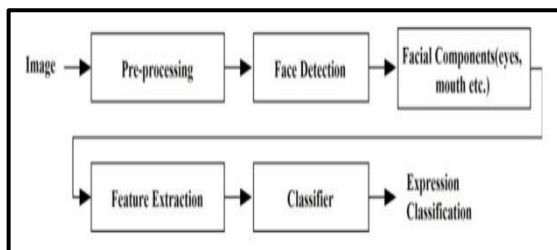


Figure 2: Facial expression classification block diagram

Alt text for Figure 2[8 words]: This figure represents the steps for detecting emotions.

Facial Expression Recognition (FER) has been an agile research area but due to intra-class variation is still considered a very challenging task. Conventional approaches are dependent upon SIFT, HOG [7] and other hand-crafted features which is then superseded by a classifier. This approach basically involves traditional two step machine learning approach which involves a combination of computer vision techniques (like feature point tracking, dense optical flow, histogram of oriented gradients HOG) [8] to extract important features from the images and a classifier step (such as Support Vector Machines, Random Forest or Neural Network) [9] which is used to detect the expression. These approaches started to show their bottlenecks with the arrival of more challenging datasets. Lately, evolving deep learning has given birth to number of different deep neural networks architectures like Recurrent Neural Network, Long Short-term Memory (LSTM), Convolutional Neural Networks. [7,8,9,10]

Fully connected layer is an essential component of *Convolutional Neural Networks* (CNNs), which demonstrates its efficiency in computer vision tasks. The CNN process usually starts with convolution and pooling layers that first break down the input images into features, and then analyze them independently. The result of this process feeds into a fully connected neural network structure which drives the final classification decision. In this paper, we propose a Kernelized Dense Layer (KDL) which captures higher order feature interactions instead of conventional linear relations. We apply this method to Facial Expression Recognition (FER) and evaluate its performance on RAF, FER2013 and ExpW [4] datasets. The experimental results demonstrate the benefits of such layer and show that our model achieves competitive results with respect to the state-of-the-art approaches.

Wong et al. [10] focused more on the convolution part and they proposed to replace the convolution layers in a CNN by kernel-based layers, called kervation layers. The use of these layers increases the model capacity to capture higher order features at the convolutional phase. In this paper, we build upon these works and introduce a novel FC layer. We leverage kernel functions to build a neuron unit that applies a higher order function on its inputs instead of calculating their weighted sum. The proposed *Kernelized Dense Layers* (KDL) permits to improve the discrimination power of the full network and it are completely differentiable, allowing an end-to-end learning. The experimental results demonstrate the benefits of such layer in FER task and show that our model achieves competitive results with respect to the state-of-the-art approaches

Many researchers used CNN for the same problem of facial expression recognition and they showed that CNN is far better as an approach to this problem. They can achieve high accuracy and can give better results. In our project also, we are going to use a CNN but with slight modification, we will use Kernelized Dense Layer in place of Fully Connected Layer.

4. Proposed Model

Machine Learning (ML) a subfield of Artificial Intelligence, is usually divided into 3 broad categories. Each category focuses on how the learning process is executed by a learning system, these categories are: supervised learning, unsupervised learning, and reinforcement learning. our problem falls into the supervised learning category since the images to be processed are labeled. In our case, the label is the emotion that the image represents.

Supervised learning has a set of tools focused on solving problems within its domain. One of those tools is called Artificial Neural Networks (ANN). An ANN is a set of functions that

1	1	1	0	0
0	1	1	1	0
0	0	1	1	1
0	0	1	1	0
0	1	1	0	0

perform label prediction. If the ANN is

1	0	1
0	1	0
1	0	1

4	3	4
2	4	3
2	3	4

analyzed as a black box; the input would consist of labeled examples, and the output would be a vector containing a set of predictions.

In machine learning, a convolutional neural network (CNN or ConvNets) is a type of feed-forward artificial neural network in which the connectivity pattern between its neurons is inspired by the organization of the animal visual cortex. Individual cortical neurons respond to stimuli in a restricted region of space known as the receptive field. The receptive fields of different neurons partially overlap such that they tile the visual field [11]. The response of an individual neuron to stimuli within its receptive field can be approximated mathematically by a convolution operation. Convolutional networks were inspired by biological processes.

CNN are category of Neural Networks that have proven very effective in areas such as image recognition and classification. CNN have been successful in identifying faces, objects and traffic signs apart from powering vision in robots and self-driving cars. Unlike traditional multilayer perceptron architectures, it uses two operations called ‘convolution’ and ‘pooling’ to reduce an image into its essential features, and uses those features to understand and classify the image. CNN consists of various steps which are described below briefly.

4.1 Convolution Step

ConvNets derive their name from the “Convolution” operator. The primary purpose of Convolution in case of a ConvNet is to extract features from the input image. Convolution preserves the spatial relationship between pixels by learning image features using small squares of input data. Brief view of how convolution operation works is given below.

Every image can be considered as a matrix of pixel values. Consider a 5 x 5 image whose pixel values are only 0 and 1 (For a grayscale image, pixel values range from 0 to 255, the green matrix below is a special case where pixel values are only 0 and 1) as shown in Fig 3. Also, consider another 3 x 3 matrix as shown below in Fig 4.

Figure 3: Pixel Matrix for an image

Figure 4: Filter Matrix

Figure.5: Convolved Image Matrix

Alt text for Figure 3,4,5[37 words]: Figure 3 is representing a 5 x 5 image's pixel values. Figure 4 is having a Filter Matrix. Figure 5 is showing a Convolved image matrix, which is calculated using matrix data of Figure 3 and 4. Then, the Convolved image of the above shown 5 x 5 image and the 3 x 3 matrix can be computed as shown in the Fig 5.

In CNN terminology, the 3x3 matrix is called a ‘filter’ or ‘kernel’ or ‘feature detector’ and the matrix formed by sliding the filter over the image and computing the dot product is called the ‘Convolved Feature’ or ‘Activation Map’ or the ‘Feature Map’. It is crucial to note the fact that the role of the filter is to detect the feature from original input image. That’s why they are feature detector. Convolution

operation is used to perform many operations on images like sharpening, blurring or edge detection by changing numerical values of the filter matrix.

4.2 Activation Step

The activation function that brings ‘nonlinearity’ to the CNN can be seen as a decision of whether to activate or ‘fire’ a neuron. The derivative of the linear function is a constant unrelated to the input, which leads to the problem in optimization that the gradient (which is constant) does not depend on the changes in the input so that the parameters are not updated. In addition, if all the activation functions are linear, the connection of layers in the CNN is a kind of linearity in which the whole network can be represented in a combination of linear manner, which is insufficient for the CNN to represent features. For this reason, the nonlinear activation function is introduced to the CNN, which provides an element-wise operation to compress pixels into a specific range.

The Rectified Linear Unit (ReLU) is one of the most famous examples of activation functions used in the CNN that replaces the negative values by zero. The function of the ReLU is shown in the formula.

$$f(x) = \max(x, 0) \quad (3.2)$$

ReLU is an element wise operation (applied per pixel) and replaces all negative pixel values in the feature map by zero. The purpose of ReLU is to introduce non-linearity in our ConvNet, since most of the real-world data we would want our ConvNet to learn would be non-linear (Convolution is a linear operation – element wise matrix multiplication and addition, so we account for non-linearity by introducing a non-linear function like ReLU).

4.3 Pooling Step

Spatial Pooling (also called subsampling or down sampling) reduces the dimensionality of each feature map but retains the most important information. Spatial Pooling can be of different types: Max, Average, Sum etc. In case of Max Pooling, a spatial neighborhood is defined (for example, a 2×2 window) and then the largest element from the rectified feature map is taken within that window. Instead of taking the largest element we could also take

the average (Average Pooling) or sum of all elements in that window.

4.4 Fully Connected Layer Step

The Fully Connected layer is a traditional Multi-Layer Perceptron that uses a Softmax activation function in the output layer. The term “Fully Connected” implies that every neuron in the previous layer is connected to every neuron on the next layer. The output from the convolutional and pooling layers represents high-level features of the input image. The purpose of the Fully Connected layer is to use these features for classifying the input image into various classes based on the training dataset.

Softmax is used for activation function. It treats the outputs as scores for each class. In the Softmax, the function mapping stayed unchanged and these scores are interpreted as the un-normalized log probabilities for each class. Softmax is calculated as

$$f(x) = \frac{e^{z_j}}{\sum_{k=1}^K e^{z_k}} \quad (3.3)$$

Where j is the index of the image and K is the total number of classes in which image is to be classified. For the purpose of facial expression recognition $K=7$.

4.5 Kernelized Dense Layer

In our proposed model to perform the project of facial expression recognition, we are going to use modified version of traditional CNN. In traditional CNN, there is a FC (Fully Connected) layer which is the last step of our CNN. This is basically a traditional multilayer perceptron structure.

In the proposed kernelized dense layers, different types of kernel methods are used to calculate the output instead of the way we calculate output for neuron in traditional CNN by calculate net input linearly and then applying activation function (Equation 3.1). Kernel methods are basically a distinct approach which basically maps the data into higher dimensional spaces in the hope that on mapping into higher dimensional space our data becomes more better structured [6]. Kernels, for the purpose of Kernelized dense layers are generally represented as $\kappa(x, w)$ where x is the input vector to neuron and w represents the corresponding weight vector.

There exist different kernel functions from the existing literature like Linear Kernel, Polynomial Kernel, Gaussian Kernel, Laplacian Kernel, Abel Kernel, Exponential Kernel, and many more.

The basic architecture of kernel neuron (neuron in kernelized dense layer) is shown in Figure 6. The simplest of all is Linear kernel, and in fact, we were using it only in traditional CNNs unknowingly. Basically, Linear kernel is nothing but simply an inner (dot) product in addition to a constant (which is optional). Hence, the formula, we have applied above to get the net input of neuron (equation 3.1) is nothing but a Linear Kernel as it gives the linear relation between input vector and weight/filter vector.

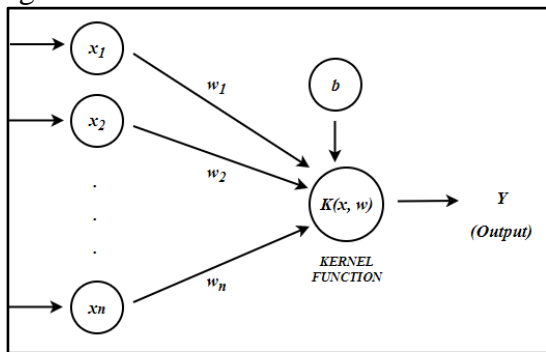


Figure 6: Architecture of Kernel Neuron

Alt text for Figure 6[14 words]: This diagram is representing the basic architecture of a neuron in kernelized dense layer.

Linear kernel can be specified more technically as:

$$\kappa(x, w) = x^T w + b$$

$$b \geq 0 \tag{3.4}$$

Mehmoudi and Chetounan[3] worked on polynomial kernel and proved that kernelized dense layer are more efficient as compared to Fully Connected layer in all respects like speed, accuracy or convergence. Polynomial Kernels are represented as:

$$\kappa(x, w) = (x^T w + b)^n$$

$$b \geq 0 \tag{3.5}$$

For n equals to 1, it is same as linear kernel. So, we generally take n>1 in above equation. The main property of polynomial kernel is that along with encoding linear relations, it also introduces non-linear relationship between the two vectors, x and w. As, polynomial kernels introduce non linearity by themselves, here we do not need to apply activation function whereas in case of linear kernel we need to

apply the activation function. Mehmoudi and Chetounan[3] performed the training for face expression recognition problem with n=1, n=2 and n=3 and studied that accuracy improved for n=3 and they got best results.

In our project, we are going to use Gaussian Kernel [12] in place of polynomial kernel. Gaussian Kernel are also known as Radial Basis Function (RBF) kernel. For the purpose of kernelized dense layer, we can define it as:

$$\kappa(x, w) = e^{-\frac{\|x-w\|^2}{2\sigma^2}}$$

where $\sigma > 0$ (3.6)

Like polynomial kernel, this kernel also introduces non linearity. One thing to note about this kernel is its property to generate nonparametric classification functions. This kernel can be best understood with the help of Gaussian Distribution. By expansion through Taylor's series [5], we can also see that it is a kernel with infinite set of features corresponding to polynomial terms. And here σ is used for the purpose of normalization.

4.6 Datasets

There are several popular datasets published for the purpose of Facial Expression Recognition. We are using FER2013 Dataset:

It is the most challenging dataset as images are not aligned and some of them are incorrectly labeled as we can see from the Fig 7. Images of this dataset have more variations as compared to other datasets. These variations include face occlusion (means a part of face is covered by hand or cap), low contrast images, partial face (only a part of the face is visible in image) and eyeglasses.

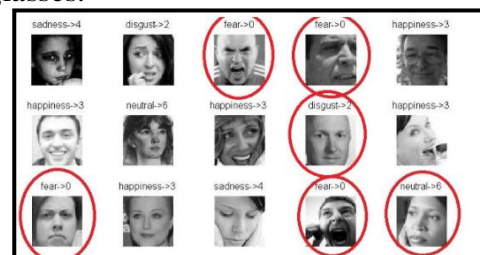


Figure 7: Sample images from FER2013 Dataset

Alt text for Figure 7[9 words]: This image is showing a part of FER2013 Dataset.

FER2013 [2] dataset comprises a total of 35887 pre-cropped, 48-by-48-pixel grayscale images of faces each labeled with one of the 7 emotion classes: anger, disgust, fear,

happiness, sadness, surprise, and neutral. In the FER2013 dataset, usage field consists of three values Training, PublicTest and

PrivateTest(validation). First five rows for each type are shown in Fig 8.

emotion		pixels	Usage
0	0	70 80 82 72 58 58 60 63 54 58 60 48 89 115 121...	Training
1	0	151 150 147 155 148 133 111 140 170 174 182 15...	Training
2	2	231 212 156 164 174 138 161 173 182 200 106 38...	Training
3	4	24 32 36 30 32 23 19 20 30 41 21 22 32 34 21 1...	Training
4	6	4 0 0 0 0 0 0 0 0 0 0 3 15 23 28 48 50 58 84...	Training

emotion		pixels	Usage
28709	0	254 254 254 254 254 249 255 160 2 58 53 70 77 ...	PublicTest
28710	1	156 184 198 202 204 207 210 212 213 214 215 21...	PublicTest
28711	4	69 118 61 60 96 121 103 87 103 88 70 90 115 12...	PublicTest
28712	6	205 203 236 157 83 158 120 116 94 86 155 180 2...	PublicTest
28713	3	87 79 74 66 74 96 77 80 80 84 83 89 102 91 84 ...	PublicTest

emotion		pixels	Usage
32298	0	170 118 101 88 88 75 78 82 66 74 68 59 63 64 6...	PrivateTest
32299	5	7 5 8 6 7 3 2 6 5 4 4 5 7 5 5 6 7 7 7 10 10 ...	PrivateTest
32300	6	232 240 241 239 237 235 246 117 24 24 22 13 12...	PrivateTest
32301	4	200 197 149 139 156 89 111 58 62 95 113 117 11...	PrivateTest
32302	2	40 28 33 56 45 33 31 78 152 194 200 186 196 20...	PrivateTest

Figure 8. Sample images(pixel) from Training, Public Test and Private Test Set

Alt text for Figure 8[25 words]: This figure is showing the sample from FER2013 dataset that contains three types of values Training samples values, PublicTest samples values and PrivateTest samples values.

4.6 Methodology

This work proposed a modified model of deep learning based convolutional neural network and is an experimental improvisation over the work proposed by *Mehmoudi and Chetounanin* [3]. Here, modification refers to the fact that in place of fully connected layer component, which is last step of traditional CNN [13], we are going to use kernelized dense layer which uses kernel neuron described in the above section 4.5. To capture higher order and nonlinear interactions, we are going to use *Kernelized Dense Layers* in our *Convolutional Neural Network* (CNN) as this increases the judgment power of our *Fully Connected layer*. We have defined the architecture of our neural network as shown in following figure 9.

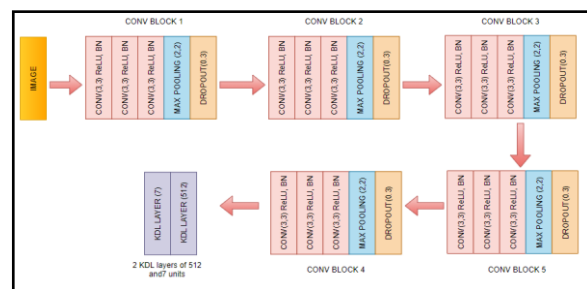


Figure 9. Architecture of the Proposed Model

Alt text for Figure 9[11 words]: The above picture is defining the architecture of our neural network.

In this project, we are going to show comparison of performance between designed Base Model (CNN with FC layer) and Kernelized dense layer model (CNN with gaussian kernel). The architecture of our model will look like following figure. There will be five convolutional blocks. First block will consist of two 2-dimensional convolutional layer [9,11,16] (with kernel size of 3X3 and *ReLU* activation function) and batch normalization after each layer and then max pooling layer with pool size of (2,2) and finally dropout layer of rate 0.3. Similarly, second block consists of three 2-dimensional convolutional layers (with kernel size of 3X3 and *ReLU* activation function) with batch

normalization after each layer and then finally max pooling with pool of size (2,2) and dropout with rate 0.3.

Rest all the 3 blocks are exactly similar to this block with just variation in number of layers. Finally, flatten the output and then define the fully connected layer for the case of Base Model and define the kernelized dense layer (with gaussian kernel) [2,3,12] for the case of our proposed model in which we will use two kernelized dense layers which consists of 512 kernel neurons and 7 kernel neurons respectively. Final layer consists of 7 kernel neurons because of the fact we are trying to classify expressions in 7 different classes. On the last KDL, we will apply the *SoftMax* activation function.

And then for the purpose of evaluation of our model, we are going to compare it with a Base model, which is traditional CNN model with similar architecture as of our model shown in above figure. Then we can compare these two models and find out the improvement in performance. Also, we are going to compare variations of our own model of kernelized layers by tuning several values of a hyperparameter sigma [12] in the equation of Gaussian kernel. So that we can find out which value gives best result.

4.7 Implementation

Implementation of our project model is done in accordance with the architecture described in section 4.6. Primarily, we have used Python language and its frameworks and libraries to implement the model. And then trained our model on GPU for 200 epochs.

We trained our model with *Adam Optimizer*[13] with learning rate of 0.001 and defining loss as categorical entropy for 200 epochs using compile and fit functionalities of *keras* library. And finally, we ran our model and evaluate the performance of both the models and compare their performance. Model was trained and evaluated for three values of a hyper-parameter sigma which is present in the calculation for output of gaussian kernel- 0.2,

0.3 and 0.4 and then compared their results. Here we have done training with the help of batch normalization to provide stability to the parameter initialization. We have used dropout layer as a regularizer with value 0.3. We have used an Adam Optimizer as it achieves good result fast, with a learning rate varying from 0.0001 to 1e-6. For training we have used accuracy metric. We trained our model on google colab for 200 epochs. Data is passed in the batch of 512 to the model.

5. Results & Discussion

Our Base Model (Fully connected Dense Layer is used) Consist of five blocks as shown below, here we have used batch normalization [14] for the purpose of providing stability to the parameter initialization. Architecture results of base model are shown in following Fig 10.

As Deep Learning Models are Data-Hungry. For such a small dataset there may be overfitting. To reduce the overfitting, we used Data-Augmentation. In Our Data-Generator, we have used *rescale = 1/255*, *rotation_range = 10*, *horizontal_flip = true*, *width_shift_range = 0.3*, *height_shift_range = 0.3*, *fill_mode = nearest* and *Batch_size = 512*. Some sample result images of Data Generation are shown below Fig 11.

As shown in Fig 12, our Base Model with Fully Connected Layer achieved maximum Validation accuracy of 66.38% for 196th epoch. The proposed model with kernelized dense layer (gaussian kernel) achieved maximum Validation accuracy of 67.83% for 186th epoch as depicted in Fig 13.

We have trained our model thrice for different values of hyperparameter sigma in our gaussian kernelized dense layer model. From various research papers we found that optimal value is between 0.2-0.4. we tried all 0.2, 0.3 and 0.4. as the value of sigma and conducted various experiments to compare them. We have plotted the results comparatively for all values of sigma in the following Fig 14.

Layer (type)	Output Shape	Param #
input (InputLayer)	[(None, 48, 48, 1)]	0
conv1_1 (Conv2D)	(None, 48, 48, 64)	640
batch_normalization (BatchNo	(None, 48, 48, 64)	256
conv1_2 (Conv2D)	(None, 48, 48, 64)	36928
batch_normalization_1 (Batch	(None, 48, 48, 64)	256
pool1_1 (MaxPooling2D)	(None, 24, 24, 64)	0
drop1_1 (Dropout)	(None, 24, 24, 64)	0
conv2_1 (Conv2D)	(None, 24, 24, 128)	73856
batch_normalization_2 (Batch	(None, 24, 24, 128)	512
conv2_2 (Conv2D)	(None, 24, 24, 128)	147584
batch_normalization_3 (Batch	(None, 24, 24, 128)	512
conv2_3 (Conv2D)	(None, 24, 24, 128)	147584
pool2_1 (MaxPooling2D)	(None, 12, 12, 128)	0
drop2_1 (Dropout)	(None, 12, 12, 128)	0
conv3_1 (Conv2D)	(None, 12, 12, 256)	295168
batch_normalization_5 (Batch	(None, 12, 12, 256)	1024
conv3_2 (Conv2D)	(None, 12, 12, 256)	590080
batch_normalization_6 (Batch	(None, 12, 12, 256)	1024
conv3_3 (Conv2D)	(None, 12, 12, 256)	590080
batch_normalization_7 (Batch	(None, 12, 12, 256)	1024
conv3_4 (Conv2D)	(None, 12, 12, 256)	590080
batch_normalization_8 (Batch	(None, 12, 12, 256)	1024
pool3_1 (MaxPooling2D)	(None, 6, 6, 256)	0
drop3_1 (Dropout)	(None, 6, 6, 256)	0
conv4_1 (Conv2D)	(None, 6, 6, 256)	590080
batch_normalization_9 (Batch	(None, 6, 6, 256)	1024
conv4_2 (Conv2D)	(None, 6, 6, 256)	590080
batch_normalization_10 (Batc	(None, 6, 6, 256)	1024
conv4_3 (Conv2D)	(None, 6, 6, 256)	590080
batch_normalization_11 (Batc	(None, 6, 6, 256)	1024
conv4_4 (Conv2D)	(None, 6, 6, 256)	590080
batch_normalization_12 (Batc	(None, 6, 6, 256)	1024
pool4_1 (MaxPooling2D)	(None, 3, 3, 256)	0
drop4_1 (Dropout)	(None, 3, 3, 256)	0
conv5_1 (Conv2D)	(None, 3, 3, 512)	1180160
batch_normalization_13 (Batc	(None, 3, 3, 512)	2048
conv5_2 (Conv2D)	(None, 3, 3, 512)	2359808
batch_normalization_14 (Batc	(None, 3, 3, 512)	2048
conv5_3 (Conv2D)	(None, 3, 3, 512)	2359808
batch_normalization_15 (Batc	(None, 3, 3, 512)	2048
conv5_4 (Conv2D)	(None, 3, 3, 512)	2359808
pool5_1 (MaxPooling2D)	(None, 1, 1, 512)	0
drop5_1 (Dropout)	(None, 1, 1, 512)	0
flatten (Flatten)	(None, 512)	0
dense (Dense)	(None, 512)	262656
output (Dense)	(None, 7)	3591
Total params: 13,374,023		
Trainable params: 13,366,087		
Non-trainable params: 7,936		

Figure 10. Results of Model

Alt text for Figure 10[10 words]: This picture is showing the architectural results of base model.

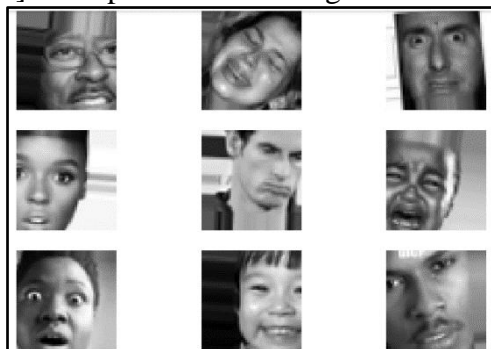


Figure 11. Sample result images of Data-Generation

Alt text for Figure 11[12 words]: This picture is representing the result images from our data generation model.

```
Epoch 00193: val_loss did not improve from 1.03818
56/56 - 47s - loss: 0.1144 - accuracy: 0.9589 - val_loss: 1.9758 - val_accuracy: 0.6417
Epoch 194/200

Epoch 00194: val_loss did not improve from 1.03818
56/56 - 47s - loss: 0.1070 - accuracy: 0.9611 - val_loss: 1.9930 - val_accuracy: 0.6582
Epoch 195/200

Epoch 00195: val_loss did not improve from 1.03818
56/56 - 47s - loss: 0.1114 - accuracy: 0.9593 - val_loss: 2.0579 - val_accuracy: 0.6462
Epoch 196/200

Epoch 00196: val_loss did not improve from 1.03818
56/56 - 47s - loss: 0.1151 - accuracy: 0.9573 - val_loss: 1.9830 - val_accuracy: 0.6638
Epoch 197/200

Epoch 00197: val_loss did not improve from 1.03818
56/56 - 47s - loss: 0.1098 - accuracy: 0.9600 - val_loss: 1.9782 - val_accuracy: 0.6526
Epoch 198/200

Epoch 00198: val_loss did not improve from 1.03818
56/56 - 47s - loss: 0.1024 - accuracy: 0.9626 - val_loss: 2.0516 - val_accuracy: 0.6487
Epoch 199/200

Epoch 00199: val_loss did not improve from 1.03818
56/56 - 47s - loss: 0.1068 - accuracy: 0.9607 - val_loss: 1.9957 - val_accuracy: 0.6571
Epoch 200/200

Epoch 00200: val_loss did not improve from 1.03818
56/56 - 47s - loss: 0.1047 - accuracy: 0.9632 - val_loss: 1.9527 - val_accuracy: 0.6565
```

Figure 12. Training results of Base Model

Alt text for Figure 12[10 words]: The figure is showing the training results of the base model.

```
Epoch 00185: val_loss did not improve from 1.07472
56/56 [=====] - 47s 842ms/step - loss: 0.2760 - accuracy: 0.8991 - val_loss: 1.6918 - val_accuracy: 0.6627
Epoch 186/200
56/56 [=====] - ETA: 0s - loss: 0.2667 - accuracy: 0.9039
Epoch 00186: val_loss did not improve from 1.07472
56/56 [=====] - 47s 843ms/step - loss: 0.2667 - accuracy: 0.9039 - val_loss: 1.6758 - val_accuracy: 0.6783
Epoch 187/200
56/56 [=====] - ETA: 0s - loss: 0.2697 - accuracy: 0.9033
Epoch 00187: val_loss did not improve from 1.07472
56/56 [=====] - 47s 842ms/step - loss: 0.2697 - accuracy: 0.9033 - val_loss: 1.7594 - val_accuracy: 0.6579
Epoch 188/200
56/56 [=====] - ETA: 0s - loss: 0.2742 - accuracy: 0.9011
Epoch 00188: val_loss did not improve from 1.07472
56/56 [=====] - 47s 842ms/step - loss: 0.2742 - accuracy: 0.9011 - val_loss: 1.7783 - val_accuracy: 0.6593
Epoch 189/200
56/56 [=====] - ETA: 0s - loss: 0.2632 - accuracy: 0.9053
Epoch 00189: val_loss did not improve from 1.07472
56/56 [=====] - 47s 842ms/step - loss: 0.2632 - accuracy: 0.9053 - val_loss: 1.6901 - val_accuracy: 0.6680
Epoch 190/200
```

Figure 13. Training results of Proposed Model

Alt text for Figure 13[10 words]: The figure is showing the training results of our proposed model.

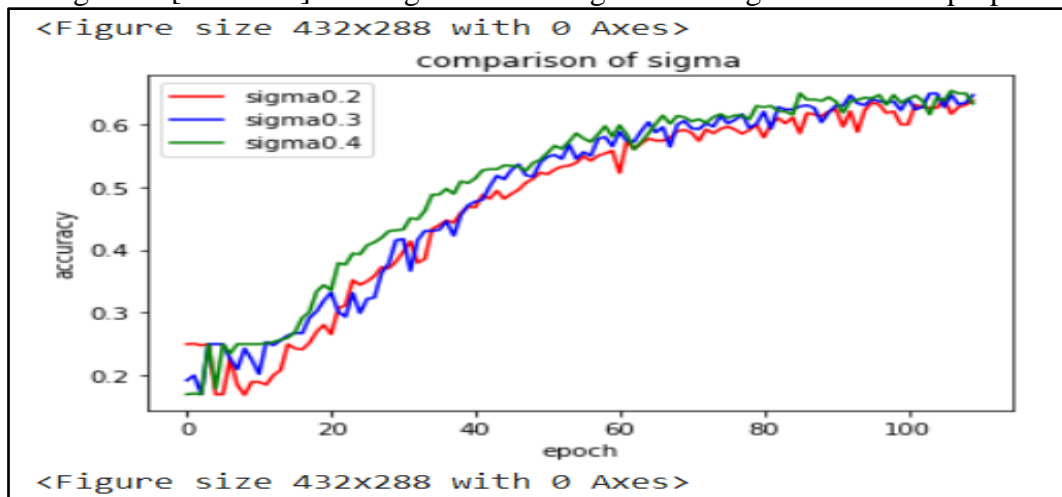


Figure 14. Graph showing comparisons of model accuracy between different values of sigma

Alt text for Figure 14[11 words]: The graph is representing the results for different values of sigma.

For comparison, we run our model for 110 epochs with sigma = 0.2, 0.3 and 0.4. In the above accuracy graph (Figure 15) red line denotes sigma = 0.2, blue line denotes sigma = 0.3 and green line denotes sigma = 0.4. We can conclude from the experiments that **sigma = 0.4 is performing better than the other two**

values as green line is always above the blue and red lines.

We also examined validation loss of all the three values as shown in the below graph (Figure 5.10). Here also the representation is same as above. Here, we can see that green line always below to the other two lines. It shows that validation loss is least for sigma = 0.4. Therefore, we can conclude that sigma = 0.4 is the optimal value for our Gaussian Kernelized Dense Layer.

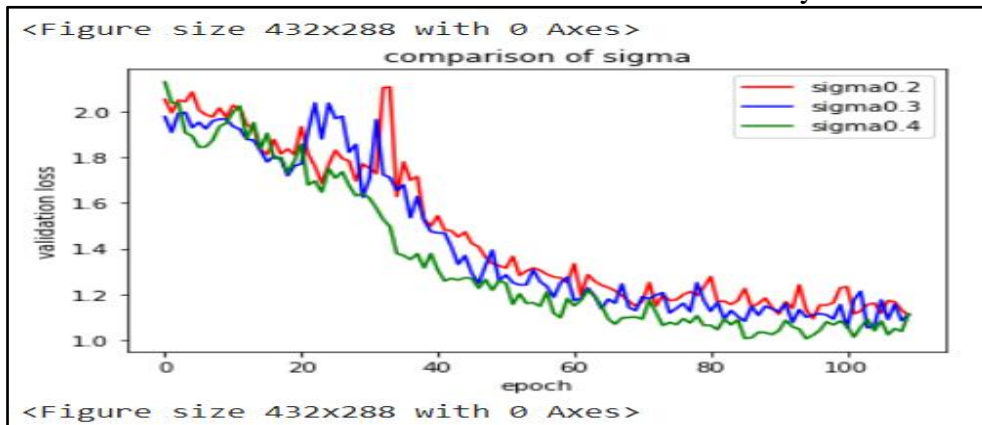


Figure 15. Graph showing comparisons of validation loss between different values of sigma

Alt text for Figure 15[15 words]: The graph is representing the results obtained for validation loss with different values of sigma.

Base model has achieved maximum validation accuracy of 66.38% whereas our gaussian model with kernelized dense layer has achieved maximum validation accuracy as 67.83%. We achieved a significant increase of 1.45% in maximum validation accuracy.

For most part of the training process accuracy of our proposed Gaussian Kernel model was greater than our base Model with fully connected layer. Its accuracy value was below initially, but after 60th epoch it was always above and the difference kept on increasing. Comparative plots of the model can be shown in the following Fig 16.

Figure 17 represents the confusion matrix to analyze the results of our model.

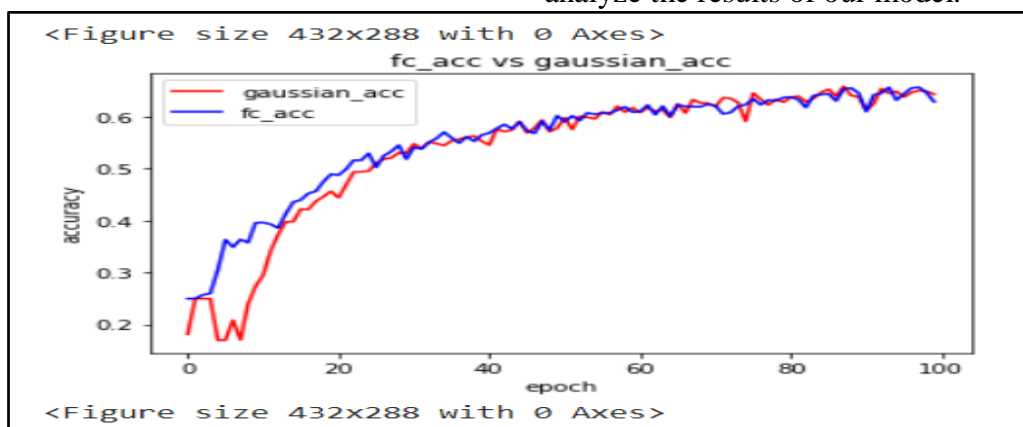


Figure 16. Graph showing comparisons of base model and proposed model

Alt text for Figure 16[13 words]: The graph is indicating the difference between base model and the proposed model.

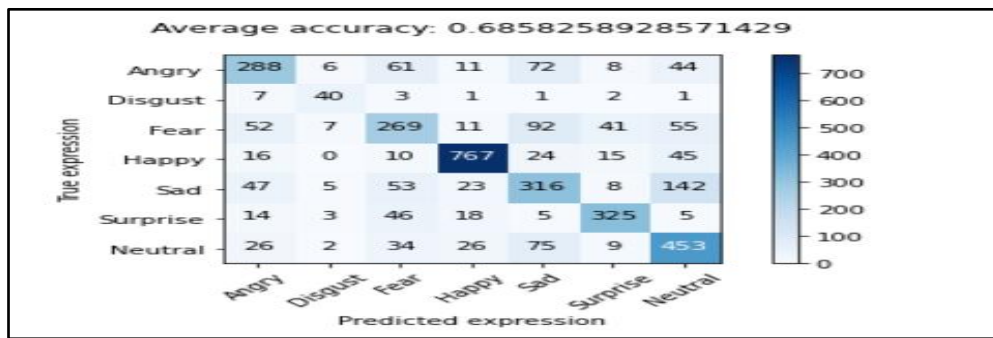


Figure 17. Confusion Matrix

Alt text for Figure 17[12 words]:This figure is representing the obtained confusion matrix of the proposed model.

We get average accuracy of 68.58% on the testing data. From the confusion matrix we can see that we get the best results for happy class as obvious because our dataset had most of the images of happy state and least for disgust class due to the low number of images of disgust class in the training data.

6. Conclusion & Future Work

The proposed model has been implemented and successfully tested with kernelized dense layer and gaussian kernel. Our model has outperformed base model by a margin of 1.45% in terms of accuracy and the achieved results are satisfactory as the average accuracies on the FER-2013 dataset is $65\% \pm 5\%$ and therefore, our proposed model is nearly accurate. Also, it shows that our kernelized dense layer with gaussian kernel is able to explore the non-linear relationships between

the image pixels and weights of our network. It basically maps the data into higher dimensional spaces in the hope that on mapping into higher dimensional space our data becomes better structured. Our results of proposed model were better than many other approaches for task of facial expression recognition.

The future scope of this work will consist of more experimental trials of trainings with optimization, training hyper-parameters and assumptions of architecture of models to get better more results than base model. Also, more work can be done in studying and concluding results and performance of the proposed model with the help of parameters like confusion matrix and some more plots of graphs for the results obtained to make comparisons easy for us. We may also look upon specific methods of extracting important features from image that plays important role in recognition of emotion or expression

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A STUDY OF POST-MODERNISM IN GALWAY KINSELL'S *WHAT KINGDOM IT WAS* AND *FLOWER HERDING ON MOUNT MONADNOCK*.

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ABSTRACT

This paper studies the Post-Modernism traits in Galway Kinnell's two poetry collections, What a Kingdom It Was and Flower Herding on Mount Monadnock. These collections discuss Kinnell's rejection of existence and faith believed by the Christian. He deals with reality rather than accepting the things which someone is passing on to the other. Kinnell's poems are a suitable part of Post-Modernism as it speaks freely without any restriction. His poems voice for reality rather than illogical acceptance. Kinnell suggests his readers to express their ideas freely and think beyond what society has offered them. Therefore, this paper studies the Post-Modernism traits found throughout the poems.

Keywords: Postmodernism, Existentialism, Christianity, Salvation, American Dreams.

Introduction

Galway Kinnell was born on February 1, 1927, in Providence, Rhode Island, and he was the fourth child of Elizabeth Mills and James Scott England. They migrated from several places like London, Ireland, Edinburgh, and Scotland. He was grown up in the city Pawtucket, Rhode Island, once a thriving mill town in the depths of the Depression. As a child, Kinnell was an introverted and mute person.

The poet spent most of his time wandering through the nearby Seekonk Woods, and he lacked interest in going to school. Once, he got a copy of *Golden Treasury* written by Francis Turner Palgrave, where he met with Edgar Allan Poe's hypnotic poems. Since the age of twelve, Kinnell has found his occupation and career in poetry. He can express his view through poetry rather than speaking words. Therefore, after reaching 18 years of age, he dedicated himself to poems with a serious purpose.

Postmodernism

The term Post Modernism was probably first used by Arnold Toynbee, the well-known historian of the twentieth century, in 1939 in his *A Study of History*, Volume 1, and that was too in a footnote on the first page. Marxism argues that Post-Modernism is an ideology that is ideally suited to express based on personal interests.

Post-Modern writers create an open discussion for readers to come up with their ideas and interpretations. It integrates vivacious

elements for the upliftment of literature and society. According to Post Modernism, nothing is true or real, and everything is ambiguous and fragmented. They trusted self-help and not on any external belief or not even on religion. Thus, Galway Kinnell was one of the contemporary poets who delved into Post-Modern views in his poems.

The poet believes in self-help rather than cringing on external beliefs. Kinnell doubted even his existence and the Christian religion. He assumes the Christian faith as a simple set of rules rather than salvation. Hence, the present paper tries to assimilate the two select collection poems, *What Kingdom It Was* (1960) and *Flower Herding on Mount Monadnock* (1964) of Kinnell, in a Post-Modernism way.

Post-Modernism View in *What Kingdom it was* (1960)

Post-modernism focussed on American Dream, which aims at happiness and independent life. Existentialism plays a vital role in this collection. The term existentialism originated with the 19th-century philosopher Soren Kierkegaard. It is a philosophical movement that views human existence, having underlying themes and characteristics such as anxiety, dread, freedom, awareness of death, and consciousness of reality. It emphasizes the person's existence as a free and responsible agent determining their development through acts of the will. It holds that there is no God or any other transcendent force; embracing the void is the only way to counter this

nothingness. Existentialism has its roots in Denmark, France, Germany, and Italy in the early development phase.

Kinnell's poems have beautifully crafted the Post-Modernism era in his collection of poems *What a Kingdom It Was*, where he questioned traditional Christianity, which fails to soothe the cease of Galway Kinnell. This collection deals with the superficiality of the Christian religion, which Kinnell cannot accept. The hyper-reality of official Christian undergoes a set of traditional rules diverting the exact rules of true Christian.

What a Kingdom It Was, written over ten years between 1950-1960. No doubt, that critic has an eagle eye on Kinnell's poetry in *What a Kingdom It Was*, and most of them were reluctant to accept the book as an unqualified success. For instance, James Dickey praised Kinnell's authentic beginning, and he added that Kinnell's vision was not as "deep and abiding" (104-5). Another critic, Sherman Hawkins, observed Kinnell's view on Christian symbology and terminology to refer to religion without meaning for him and concluded, "Kinnell seems to be a religious poet without religion" (63).

Kinnell asks questions for his doubtless Christian religion, which gives inadequate meaning to his vision of faith. The poem *The Supper After the Last*, published in 1960, explains Kinnell's rejection of the traditional belief of secularised familiar spiritual phrases. He expects to get salvage from the alienated condition and to discover the new truth. The poem contains five broken images, strongly influenced in form and substance by Spanish and French surrealists—the opening section deals with the world of sand and illusionary water, a wasteland world of spirituality dreariness.

In this poem, the wild man, who is supposed as Christ comes from the desert to share the host's table, is neither prophet nor the Saviour. He nevertheless embodies the truth of earthly existence:

I came not to astonish
But to destroy you. Your
Jug of cool water? Your
Hanker after wings? Your
Lech for transcendence?
I came to prove you are

Intricate and simple things

As you are, created

In the image of nothing,(39- 47)

The reference mentioned above reveals that Christ came to declare that there is no resurrection. He claims that humans are made from the image of nothing and will die as nothing. Therefore, humans should not lust for transcendence; rather, they must accept death as natural.

The Saviour appears like a mirage in the poem's last section, only avoiding Kinnell's longing for salvation. For Kinnell's, believing in Saviour Jesus is fading. He could not feel the way the world told him. Kinnell says that humans think the truth of human existence through the voice of Saviour. He could not accept the teachings of Christianity, and thus, the poet finds its emptied and increasingly secularized symbols everywhere. Its emptiness suggests that humans as creatures of nature live and die in the heart like all other living beings. He could not believe Christianity when Saviour Jesus Himself symbolized death.

In the 1960s, Kinnell has found his major themes like death, alienation, pain, loneliness, and brevity of life. Still, only a few major themes have been touched upon in the *What a Kingdom It Was*, which becomes the pivotal quest of Kinnell to complete the self by immersing in all the experiences of human life. Therefore, in the poem "Toward the Wilderness," Kinnell gives an example of Moses from the Bible who led Israelites out of Egypt and crossed "the Dead Sea, that will neither / Renew nor drown him" (6-7). He crosses the Death Sea by dividing it into two parts and leads Israel to cross it. God made Israelites wander for 40 years instead of days to reach the Promised Land because Israelites did not believe in Lord.

After 40 years of wandering in the desert, Moses died with insight of the Promised Land on Mount Nebo. In the Bible "Deuteronomy 33: 1-5," Moses and his people reached Mount Nebo, but Moses could not enter to Promise Land, but he died looking at the sight of Promise Land. In "Deuteronomy 33: 4," God says to Abraham:

This is the land which I swear unto Abraham, unto Isaac, unto Jacob saying, I will give it

unto thy seed: I have caused thee to see it within eyes, but thou shalt not go over thither. In the mentioned reference, Lord says to Moses that He swore to Abraham, Isaac, and Jacob that He would give Promise Land to their seeds. Still, He will not allow Moses to enter the Promised Land because, like Israelites, Moses had also broken his faith with God in the presence of the Israelites. So Lord says to Moses in “Deuteronomy 32: 51-52” that:

Ye trespassed against me among the children of Israel at the waters of Meribah-Kadesh, in the wilderness of Zin; because ye sanctified me not in the midst of the children of Israel.

Yet thou shalt see the land before thee, but thou shalt not go thither unto the land which I gave the children of Israel.

Therefore, the reference mentioned above clearly states why the Lord does not allow Moses to enter the Promised Land.

So, in the above poem “Toward the Wilderness,” Kinnell alludes to the story of Moses and says that “Moses died looking this way, / And see the bitter land, and die of desire” (14-15). The poet calls Promise Land bitter because Moses could not enter Promised Land, although he led the Israelites for 40 years seeking this Promise Land, where milk and honey flows. His hardworking of seeking goes in vain.

Therefore, Kinnell poems discuss the very reality of existence that no matter how much we work, we have to die one day. His ideas make readers feel injustice towards the followers of the Lord, where one could not claim their rights like Moses, who struggles to reach but unfortunately, Moses could not fulfil his desire. It makes the poet feel guilty for Moses that his existence became invaluable in front of the Lord. So, this collection, *What a Kingdom It Was*, contains Post-Modernism characteristics that search for freedom of human existence and reality. It searches for the meaning of life, which gives space and happiness.

Post-Modernism View on Flower Herding on Mount Monadnock (1964)

The Post-modernism era has influenced the author so much that he denies any truth in the text narrating the history or past of Christian

Saviour and claims as mere believers. As a postmodernist writer, he questioned his existence; this era fragmented everything in human lives through illogical truth and disturbances.

The poem “Ruins Under the Stars” contains five parts that stress the physical, emotional state of loneliness and solitary lost soul. It reflects on Kinnell's emptied life and tries to escape from it, and hopes to get spiritual resurrection through participation in the sights and sounds of nature.

In part 1, Kinnell was devastated with his life and the American Dream's vision, exemplified by the newspaper article criticizing the independence calling them Mugwapa. The Mugwumps were the Republican political activists in the United States who were intensely opposed to political corruption. Thus, the speaker suffers from both internal and external.

In part 2, the speaker yearns for a spiritual connection to ease his loneliness, but he is frustrated by the destruction of passing the time and his failure to believe in Christian views of love and guilt. He feels the need to change himself like snakes change slough off the old skin. The poet says:

Every night under those thousand lights
An owl does, or a snake sloughs its skin,
A man in a dark pasture

Feels a homesickness he does not understand.(17-20)

Therefore, the poem symbolized birds as freedom and spirituality. To ease loneliness, Kinnell took the help of geese as a personification of himself for release.

The final section of the poet describes Kinnell as rejecting the Christian religion. The bird swallows got replaced by a bat that associates black magic, evil, and the dark human side. The day was replaced with night and light by darkness. Thus, these pictures disturb Kinnell's mind and his faith.

In “Being with Reality: An interview with Galway Kinnell,” Kinnell declares that the word God in “The Olive Wood Fire” is a metaphor for his son, Fergus. He takes his son as the embodiment of the sacred character of life. He continues, “Of course I was raised as a very devout Christian, and I believed very much in God, so the word God has a

resonance for me that can never be taken away” (175). The interviewer asked Kinnell that “You have never moved away from that background?” (175), for which Kinnell replied I have in the sense that I’m not a Christian now; I certainly don’t believe in Christianity. I regard it as a system; a complete invention of the species to make life and especially death more comfortable. So I certainly abandoned Christianity; however, the language of Christianity remains with me. It’s a language that wasn’t invented by Christianity; the Christians borrowed it from elsewhere. So I don’t feel that in using the Christian’s language I am appropriating Christianity or implying that I still am a Christian. (175)

Therefore, in the above reference, Kinnell has declared his ideas regarding Christianity. He claims that using the Christian language does not mean that person is Christian. Rather, he suggests that everyone has the freedom to

convey the message in any language. Kinnell says that the English language was not invented by Christian, but they borrowed from somewhere else, so he does not feel that using of Christian language indicates him as Christian.

Conclusion

Kinnell’s poetry is great in conveying messages to Post-Modern readers. It suggests the reader’s independent expression. Literature gives freedom to explore their ideas; thus, Kinnell’s poetry can be explored in various dimensions; as Roland Barthes has suggested in *The Death of the Author*, the text is open to all. Therefore, this present paper particularly discusses the Post-Modernism view in these two collection poems, revealing Kinnell’s rejection of Christian faith inexistence and religion.

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INTERNET OF MEDICAL THINGS (IOMT) BASED REAL-TIME, MULTILAYERED ARCHITECTURE DESIGN FOR SMART HEALTHCARE MONITORING SYSTEM

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ABSTRACT

The Internet of Things (IoT) can be characterized as a standard in which various objects are equipped with different sensors, actuators and processors to interact with each other or with humans too. Medical application of IoT is application of different supporting technologies of IoT to help the medical practitioners to provide remote non invasive physiological monitoring of patient reducing their visits to hospitals and load on medical services. This paper investigates different frameworks proposed for smart healthcare system and extracts the analytical outcomes and proposes state-of-art real-time multilayered IOMT architecture. The proposed architecture is implemented by designing a prototype using basic building blocks like Raspberry Pi, DSC-103, MAX 30100 and ADC. The experimental results show the real-time transfer of medical data to cloud through an app.

Keywords: IOMT, Smart healthcare, Raspberry Pi, DSC-103, MAX 30100

1. Introduction

The Internet of Things (IoT) is a technique that allows physical devices to communicate with each other, collect and share data and to generate information that is useful to humans. It aims to allow devices to connect anytime, placed anywhere and using any network or service. This is a new internet revolution that combines directly the physical world and computer based system resulting in reduced human intervention. However, without any human intervention, IoT facilitates an intelligent interaction between systems and platforms.

In the area of healthcare systems, IoT has become more productive. It plays an essential role in the growth of smart healthcare systems. It allows to use diagnostic tools for better therapy for patients, and tools which can enhance the quality of life of all the people. The various tools like Atmotube 2.0, Sensibo Sky, Withings etc connect wirelessly to a smart device or an app in order to get required health data [1]. It also requires the data connection to transfer collected data to a physician via smart device. Further, these devices collect important information or data by using existing technologies like Bluetooth, Wi-fi, RFID, GSM, WSN, ZigBee etc. and also enables real-time monitoring. In smart healthcare sector, the benefit of IoT is to enhance the efficiency and transform the conventional concept to smarter healthcare [2]. Figure 1 shows the general

diagram of smart health care system. For individuals who do not have access to immediate healthcare facilities and therapy, IoT technology is known to be a boon. It has increased the performance of medical sector and treatment programs for elderly patients and even for children too. It can store thousands of computerized patient data and enables patient to collect the data at any time [3]. Several health sensing devices are created that are more compact, allowing patients to conveniently wear them for monitoring. These devices including sensors are attached to the patient and they operate in such a manner that the doctor can track the condition of the patient at any time. Since, IoT-assisted patients can be reached over the internet; it is possible to identify the patient's health status at the right time so that appropriate action can be taken. [4] Smart healthcare concept includes concepts of eHealth and mHealth services, managing the electronic health record, smart home services and wired connected medical devices.

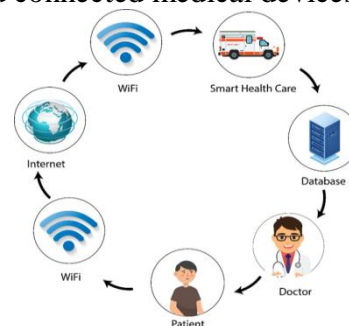


Fig.1 General diagram for smart healthcare using IoT

But some issues that still exist are as follows:

- **Power:** Several IoT sensors require a continuous source of energy to sense and communicate with other devices. This leads to a challenge in terms of battery life and cost.
- **Storage:** Often, storage capabilities of edge node do not support complex operations, such as cryptographic operations, for the computational activities.
- **Data management:** Millions of devices are linked to smart healthcare, which may generate a huge amount of data for analysis. It is important to use accurate data models and semantic explanations in the IoT.
- **Network:** It is a concern if a higher number of devices are linked to the IP network to pass packets within the time frame.
- **Quality of Services (QoS):** In healthcare systems, it is an important factor which is extremely time-sensitive. There are different challenges to meet the quality specifications based on IoT applications, such as energy efficiency, data quality, usage and latency of network devices.

To overcome such issues, various researchers have been studied. For instance, [5] has introduced an optimization algorithm which applies to Healthcare 4.0 trends. It improved the efficiency of blockchain based decentralized applications for the smart healthcare system. But it requires high and complex computation activities. [6] Proposed a framework of e-healthcare which deals with electronic medical records (EMRs) that protect the privacy issues. The results of experiments performed and its comparative analysis confirm that the method is useful and efficient for e-healthcare in hybrid cloud-fog network. It is implemented in software only. Similarly, [7] aims to create a platform that may be configured and adapted for monitoring comprehensive parameters with the help of wearable. Here a novel wrist-worn prototype is developed for constant monitoring, and an adaptive and flexible IoT gateway but clinical investigations are not done with the prototype.

To figure out the solutions of above mentioned problems and fully combine the various advantages for smart health care, this paper contributes by:

1. Presenting a comparative analysis of various healthcare frameworks present.
2. Proposes a five-layered architecture for smart healthcare.
3. Experimental implementation of proposed architecture.

The rest of the paper is organized in the following pattern: section 2 presents the review of the present work done, Problem is defined in section 3, section 4 discusses IoMT. The proposed architecture is presented in section 5 and prototype developed for implementation is shown in section 6. Section 7 describes the results and paper is concluded in section 8.

2. Related work

IoT enables a centralized network for interconnecting various devices which can, within a system, produce and share data. It is also possible to track and collect all the data in real time, which offers an analytics passive combination of materials. So by using IoT in healthcare sector, it is possible to convert a traditional hospital into a smart hospital. It also provides an advanced facility where everything is simultaneously monitored and controlled; whereas, all the information is gathered in a centralized database. These technical features provide a variety of possibilities to enhance the comfort, performance and even budget-saving options of modern hospitals. Review of the literature has been carried out related to smart healthcare.

Diane J. Cook et.al in [8] provide vigorous activity recognition or tracking capabilities of a smart home and identify activities by designing a framework of Smart apartment using methodology of Hidden Markov model, naive Baye's classifier and random field classifier.

A. Jara et.al in [9] proposed YOAPY that integrate clinical devices with telehealth enterprise Information and Knowledge Infrastructure to predicted health anomalies and provided feedback to the patient. The large volume of data which is generated by various sensors is managed using Knowledge Based Systems.

V. Miori and D. Russo in [10] present a semantic model of domestic network considering distributed environment. The model would provide some applications based on semantic interoperability among different

devices in homes connected by using different heterogeneous technologies, modeling the behavior of devices using machine learning and data mining softwares like Domopredict. Lei Yu et.al [11] presented a model of smart hospital which is based on IoT. WSN and M2M technologies are mainly used to design the architecture. It would help in Patient Tracking/ Remote Patient Monitoring. The model is efficient enough to collect the data, access the data, transmit it using WSN and M2M technologies and develop applications for various personnel. Authentication of users is done by unique username and password. Savola, Reijo in [12] targeted to improve adaptive security solutions and can adapt security parameters in accordance with changing environments. The security metrics are computed according to Markov game theoretic model. The security metrics measure and evaluate the adaptivity during run time and perform risk impact assessment. Berhanu, Yared et.al. [13] developed ASSET (Adaptive Security for Smart Internet of Things in eHealth) testbed with 95% efficiency and developed a strategy that gives estimate of energy consumption by using Holt-Winters prediction model.

Geng Yang et.al in [14] present iHome Health-IoT to realize integrated Health Information System (HIS). HIS provides services like remote prescription of medicines to patient, generates reminder for taking medicines, report non compliance of medication and alarm for First Aid. Different communication protocols like Bluetooth, RFID, Ethernet, Wi-Fi, ZigBee, CDM and 3G/4G are used. S. Amendola et.al in [15] surveyed on the RFID that are applied to body centric systems to gather information about the living environment of user to monitor the health of user and provide remote assistance. M. P. R. S. Kiran et.al in [16] proposed an intelligent transmission procedure which transmit the data when there is some abnormality in the data sensed by the sensors. Authors propose two rule engines, one for comparing data with one fixed value. Other rule engine is adaptive rule engine in which data is compared with two values at some parameters through sensors using 6LoWPAN technology that integrates the functions of RFID tag as well as RFID reader. Table 1 presents the comparative analysis of various frameworks proposed by different authors for smart healthcare using IoT.

Table 1: Comparison of various frameworks

Ref	Brief Description	Developed Framework	Implemented	Hardware / software implementation	Advantages	Limitations
[8]	To provide robust activity recognition and tracking capabilities for smart home and to identify the activities.	The smart apartment which housed a single older adult resident	Yes	Software	Activity recognition and Automated health monitoring can be achieved through activity profiling techniques .	Couldn't design an algorithm that act as a complete system that performs assessment of adults.
[9]	To predict health anomalies in real time, send alerts, reminders and offer an enriched feedback to the patient.	Integrated Clinical devices with the telehealth enterprise Information and Knowledge Infrastructure	Yes	Hardware (using commercially available modules)	Transmission of the packets according to YOAPY and work over the pre-processed data to increase scalability of data (big data) provided by the sensors.	Lack on the analysis of the overload for a light version of IPv6 for Wireless Sensor Networks and for IoT technologies
[10]	Aims to determine DomoPredict with real-time systems for conducting behavioural analysis of elderly	Smart home telecare devices	No	Software	User friendly human-machine interface (HMI) based on the use of natural language is developed.	Lack of creating an advanced graphical user interface for the system

[13]	Setup of a testbed for adaptive security for the IoT	ASSET (Adaptive Security for Smart Internet of Things in eHealth) testbed	Yes	Hardware(using commercially available modules)	Developed an estimation strategy of the energy consumption	Performance of algorithms not evaluated in terms of power consumption, communication overhead, and robustness.
[14]	Proposed and implemented an intelligent home-based platform, the iHome Health-IoT	iHome Health-IoT system	Yes	Software + Hardware(using commercially available modules)	Improved user experience and Service efficiency	Enriching the iMebBox's GUI with more user friendly functions
[19]	Proposed IoT-aware, smart healthcare architecture for automatic monitoring and tracking of patients, personnel, and biomedical devices .	Smart Health care Systems	Yes	Software	Able to collect, in real time, patients' physiological parameters via hybrid sensing network (HSN) composed of 6LoWPAN nodes.	Limited to hospitals and nursing institutes
[20]	Illustrated the design and implementation of a smart health monitoring system	Smart health care system	Yes	Hardware(using basic blocks)	Doctor can view the patient's vital parameters remotely and dynamically in a Web page in real time via internet connection	Work is done based on single person's data collection
[21]	Presented CUIDATS an IoT hybrid monitoring system for health care environments which integrates RFID and WSN technologies	CUIDATS Hybrid monitoring system for health care environments	Yes	Hardware + software	The CUIDATS platform guarantees the required transparency of the system	The current hardware limitations on RFID sensing capabilities
[22]	Proposed the remote patient health monitoring by using the concept of fog computing at the smart gateway.	Fog computing-based patient monitoring in smart homes	Yes	Software	Real-time alert generation with event severity computation further enhances the utility of the proposed system	Introduced fog layer at a gateway that requires quick processing with minimal delay.
[40]	Reviewed actual adoption of smart home services for healthcare by the elderly people	Smart homes from healthcare perspective	Yes	Software	The model is associated with the elderly people and includes features that are unique to such a population	Currently not available due to geographical distribution of the elderly subjects.
[42]	Proposed IREHMO- IOT-based remote health monitoring system	IREHMO	Yes	Software	Reduced bandwidth and reduced data packet size for small size healthcare data.	Generate large-scale data that needs to be processed using cloud services

[43]	Used IoT architecture for capturing voice, body temperature, electrocardiogram, and ambient humidity.	A framework for voice pathology monitoring is developed.	Yes	Software	Secure transmission	Issues of scalability, secured transmission, availability, ease of users.
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3. Problem definition

Smart healthcare is a system that involves remote monitoring of patient. In this, the patient uses some sensors that constitute Body Area Network (BAN) and communicate the vitals to edge node. Various frameworks proposed by different researchers were studied and some limitations were identified like:

- It is observed that most of the proposed frameworks are implemented in software and some those implemented using hardware, the commercially available modules are used that are much costlier.
- Various papers are not focusing on real time processing in IoT smart healthcare system.
- Also very little work is done on implementing framework in hardware using basic components like microprocessors, sensors, communicating modules etc.

So to overcome these problems, this paper presents and proposes a Real-time multilayered IoMT based smart healthcare architecture.

4. Benefits of IoMT

Application of IoT in the medical field (IoMT) is transforming the healthcare sector in incredible way by providing services like personalized, easily accessible and other services at a low cost. It is also providing applications to various entities of healthcare system as follows:

Patients: This application has been a major impact on the people alone with their families. Especially for elderly patients, IoT has changed their lives by accessible facility like constantly tracking the routine check-up. For example, wearables devices such as fitness bands, it

evaluate patient’s heart rate, blood pressure, glucometer etc. and connects wirelessly. If any problem arises during activities, it sends signals to family members and alert them. It also provide special attention to patients. These devices also have remind or alert special feature like count calorie, blood pressure follow up types of exercise and appointments and so on.

Hospitals: In hospitals, IoT devices has provided useful services like monitoring patients’ health, track movements of medical staff and location of medical equipment’s which can calculated in real time. Besides, for patients’, the spread of infections is an important concern. IoT enabled device, monitoring hygiene, to prevent spreading infections from one patients to another. It has helped other managements such as inventory pharmacy control, monitoring environment behaviour, temperature control and so on.

Insurance organisation: Insurance organization provide reward to their customers for sharing and using generated health data , tracking follow up activities and provide therapy to the desired patient’s by using IoT devices. It allows insurers to significantly limit claims and also enables insurance organisation to validate claims virtue data obtained by these devices. Thus IoMT provides various benefits for smart healthcare such objective reporting, remote monitoring, local activity recording, automation, precise medicine and adaptability. All these benefits are connected via technologies like Bluetooth, Wi-fi and so on. However, personal healthcare professionals also provide other facilities like box of smart pills, electronic pills and so on.

Table 2: Benefits of IoMT

Reporting objective	Based on the activities, devices can record and report the level of the nervous system. This factor also checks the status of the patient’s disease and suggests efficient therapy.
Remote monitoring	Based on the accountability of number of patients, a doctor will provide healthcare “report card”. Instead, relying on the patient’s summary, you can talk to the real patient therapy compliance.
Recording activity	Recording devices allow to collect or access previous data by improving filtering mechanism action of the chronic diseases. Further, these devices also help to provide accurate method or therapy to prevent diseases.
Automation	The device automation and recorded therapy can reduce human errors or fake report in the hospitals and sub-acute care facilities.
Targeted medicine	Precise stimulation can improve therapy for individual and reduces unwanted side effects. It can also stimulate to a specific target which is much higher than degree.
Adaptability	Several systems are determined based on a feedback loop. It will restate on the basis of the feedback and try to adjust for improved patient results.

5. Proposed work

Here we propose a realtime multilayer IoMT model. Figure 2 shows the multilayer architecture.

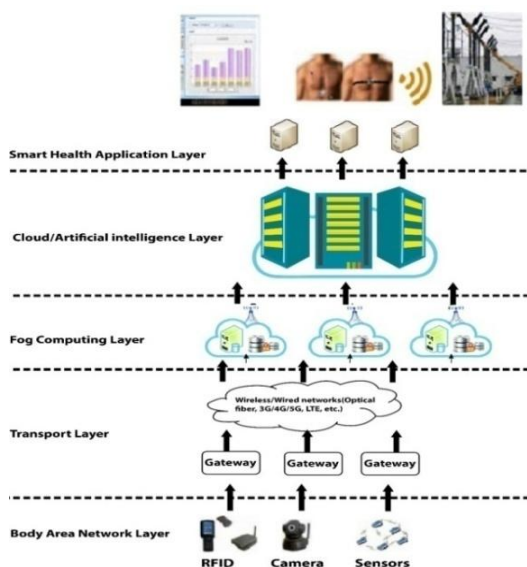


Fig. 2 Multi layered IoMT Archietcure

The architecture of the model consists of five layers: body area network layer, transport layer, fog computing layer, Cloud/AI layer and smart health application layer. Each layer has its own functionality. Basically architecture is designed for physical network’s components to identify its principle, functional organization specifications.

- **Body area network layer:** It is the first and lowest layer in the given framework, also called sensor layer. It aims to gather necessary data from the environmental components such as WSN, RFID, sensors etc [25](Figure 3). According to the applications requirement; sensors are selected. However, collected data by the sensors consists of environmental behaviour like location, air quality, movements and so on.



Fig. 3 Various components of BAN layer [25]

- **Transport Layer:** It is the second layer which is present in the framework, also called transmission layer. It also acts as a middle layer between body area network layer and cloud/AI layer. It collects data from the physical components through sensors and transfer and process data. However, transmission of data can be based on Wired, Wireless. Various communicating protocols that can be used are LTE, Wi-Fi, Bluetooth, 5G, etc. (Figure 4) [26]

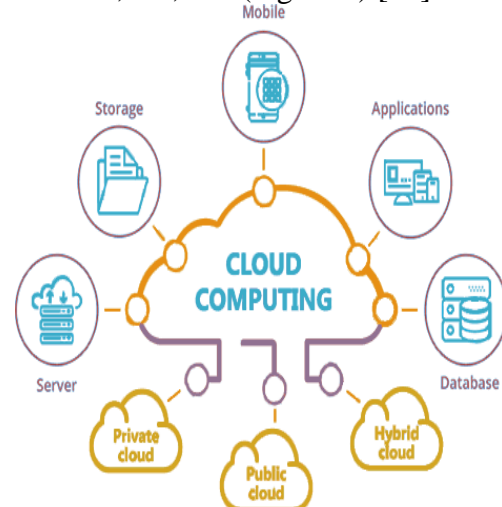


Fig. 4 Communication technologies used by transport layer

- **Fog computing layer:** It is the third layer, which provides solutions to the cloud problems, called fog computing (Figure 5) [27]. It acts as a middle layer between the cloud and components. Thus, with the presence of fog computing layer, the components are able to communicate directly with the cloud. It also provides a method which can store and compute resources of cloud to the local network. It allows to predict and process data locally in the fog nodes. However, low latency, high bandwidth, and security are also supported. It may decrease the northbound traffic which is provided by the cloud.



Fig. 5 Applications of fog layer [27]

- **Cloud/AI Layer:** It is the fourth layer that contains distinct components like storage, analytics and visualization (Figure 6) [28]. Its purpose is to design a system to store long term patient’s data along with health professional report card. The functions of various components of this layer are managing big data, AI, Cloud computing, etc.



Fig. 6. Applications of cloud layer [28]

- **Smart health Application layer:** It is the last layer in the framework which defines all applications that are supported by IoT technology. It also has ability to provide services to the applications. For example, smart homes, smart cities, smart healthcare and etc (Figure 7). These services provide facilities to each application because services depend on the data that are obtained by sensors. Besides these, there are various issues in this layer with most common issue of security. However, IoT technology, has enabled to make a smart home facilities even after having various threats and vulnerabilities which are present inside and outside in the device. It is because present of weak computational power and a low amount of storage such as ZigBee [29].



Smart Home, Wearable Device, Hospital
Fig.7 Smart health application layer [29]

6. Prototype developed

The proposed framework is implemented using a basic testbed consisting of following components:

1. Raspberry Pi 4
2. Max 30100 Sensor(SpO2)
3. DSC 103 sensor
4. ADC
5. Python (software component)
6. Flask api
7. MongoDB

The testbed developed to implement the proposed architecture is shown in Figure 8. The sensors, raspberry pi and ADC form the body area network layer and transport layer.

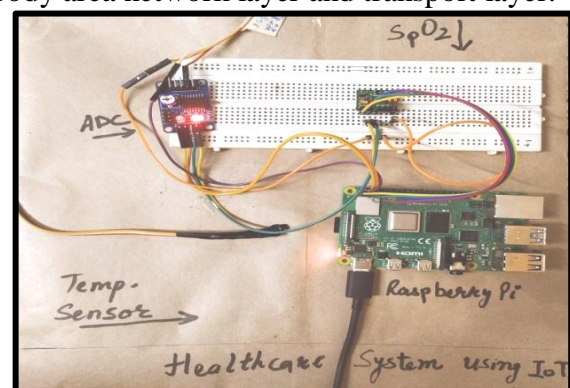


Fig. 8 Smart healthcare system prototype

The edge node (laptop) to which raspberry pi is connected constitutes fog layer while the Wi-Fi present in Pi acts as gateway to connect to cloud layer.

Working: The sensors measure body vitals (body temperature, pulse rate and blood oxygen), communicate it to the edge node (laptop) via raspberry pi. Here the patient information is segregated into two parts: Sensitive information (including body vitals) and non sensitive information (including name, age, sex etc. of patient). In order to reduce the data on cloud, only sensitive is uploaded in real time. Also the data is collected by MongoDB at pi. An app is also designed using Flask API that helps to monitor the medical data in real time and graphically at laptop or at smart

phones helping the users to understand the health of human being under observation.

7. Results

The results of app showing the vital parameters graphically in real time are presented in Figure 9, 10 and 11 for body temperature, blood oxygen and pulse rate.

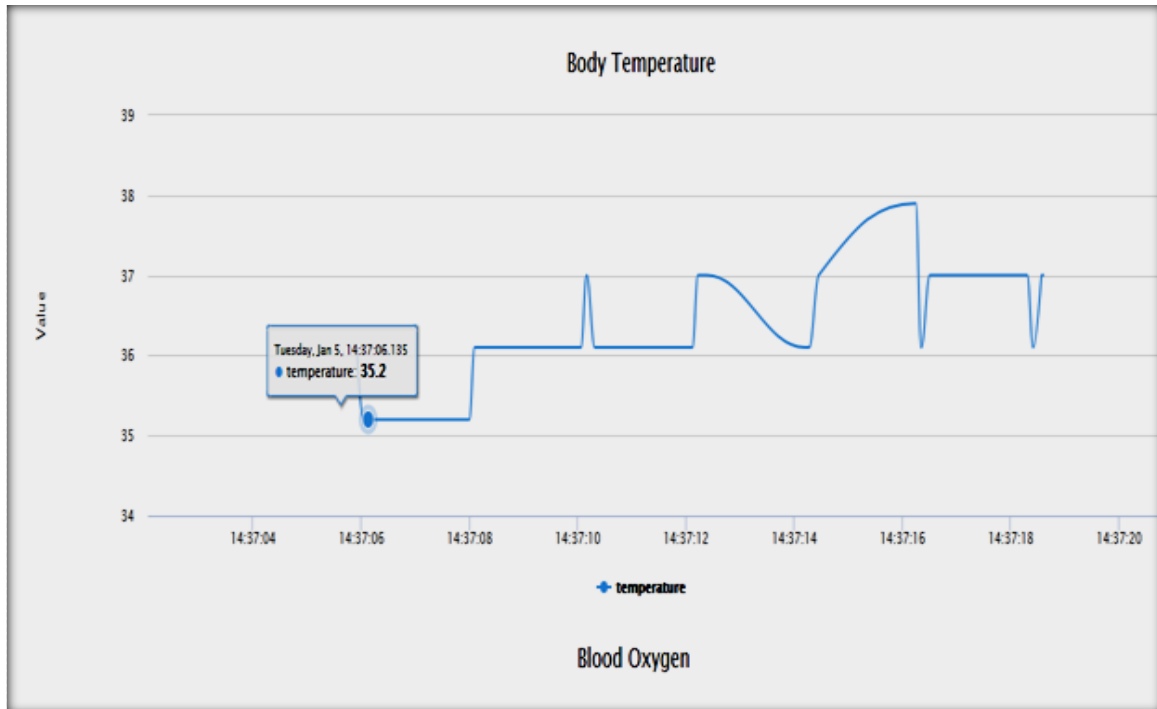


Fig. 9 Graph showing body temperature in realtime

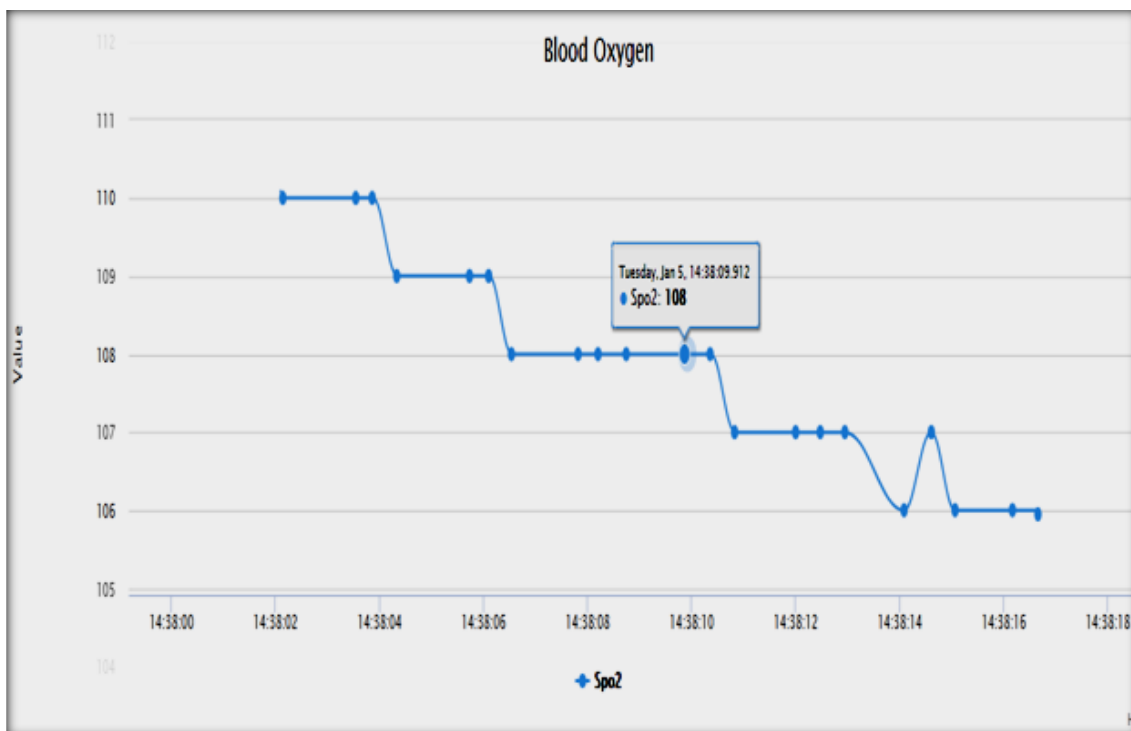


Fig.10 Graph showing blood oxygen in realtime

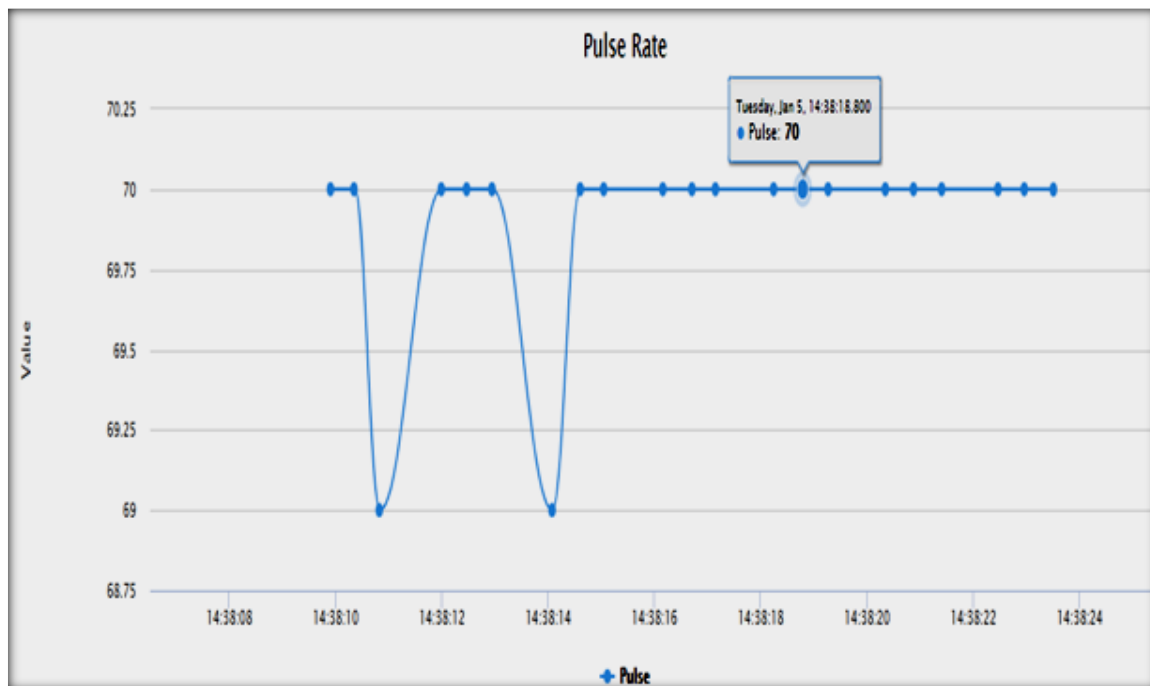


Fig. 11 Graph showing pulse rate in real-time

8. Conclusion

In this paper, different state of the art methods, protocols and applications of IoT are reviewed. This paper covers analysis of different frameworks present for smart healthcare system. Internet of Medical Things (IoMT) is described in detail with its comparison to IoT. Application of IoMT to design a healthcare system is explored in the paper. An IoMT multi layer architecture framework for smart healthcare system is proposed in this paper. Purpose and applications of each layer of IoMT architecture are discussed in detail. Further,

the proposed architecture is implemented using a testbed comprising of basic development board alongwith sensors used to measure vital body parameters. The results of the smart healthcare system are also shown. Real-time measurements of body parameters like body temperature, pulse rate and oxygen saturation in blood are shown. In future work, encryption techniques would be used on the two different data sets so as to transmit the information in a secure manner over cloud. More sensors may be used to enhance the effective usage of the IoMT architecture.

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