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**ICOMDA 2022**

Proceedings of

# International Conference on Management & Data Analytics

20 & 21 October, 2022

*Organized by:*

CMR University

School of Management

#2, 3rd 'C' Cross, 6th 'A' Main, HRBR Layout, 2nd Block.

Kalyana Nagar, Bengaluru 560043, India.

*In Association with:*

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*Editor:* **Dr. Om Prakash .C**

# International Conference on Management & Data Analytics-ICOMDA 2022 20-21 October 2022

Chief Editor: Dr.Sugant R  
Editor: Dr.Om Prakash C

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## Chairman's Message

The School of Management, CMR University is hosting a three-day International Conference on Management and Data Analytics (ICOMDA2022) from October 19<sup>th</sup> to 21<sup>st</sup>, 2022, in collaboration with Ariel University, Israel. I understand that there is a Pre-Conference Workshop also planned for October 19<sup>th</sup>, 2022.

I am immensely pleased at this initiative. This conference is being organised to further the stated vision of CMR University, which is “to nurture creative thinkers who will drive positive global change”. Through this conference, our undergraduate, postgraduate and PhD scholars are given an opportunity to present their research findings to an international audience, and to benchmark themselves against research done by scholars from different parts of the world.

The conference proceedings are being published in the form of a book to facilitate future reference and secondary reading. The proceedings are being published with an ISBN Number, which will be useful for the participating research scholars and others, who wish to use this as a reference.

Wishing all the delegates and participants all the success and meaningful learning during the three days.

**Sri. K.C. Ramamurthy**, IPS (Retd.)  
Chairman, CMR University & CMR Group of Institutions  
Former Member of Parliament, Rajya Sabha

## **Chancellor's Message**

I am happy that the CMR University School of Management is holding a three-day International Conference on Management and Data Analytics (ICOMDA2022) in collaboration with Ariel University, Israel, and note that a relevant theme has been chosen for extensive deliberations.

The School of Management, CMR University has been regularly conceiving and hosting such events and I am sure that this conference will also measure up and exceed the high standards set by them.

At CMR University, it is our constant endeavour to provide as many opportunities for our students to show-case their abilities and capabilities as possible; ICOMDA 2022 is one such opportunity. This is keeping with our strategic framework of equally focussing on Core Academics, Common Core Curriculum and LEAP programmes, which results in the holistic development of our students. At CMRU, students are exposed to several knowledge-enhancing and skill-building programmes, which are relevant to their future career choices. It is our constant endeavour to help our students “learn how to learn”.

Wishing the conference team at School of Management all the very best and hope that the delegates have a wonderful experience at the conference.

**Dr.Sabitha Ramamurthy**

President, CMR Jnanadhara Trust

Chancellor, CMR University

## Message from the Editors

It gives immense pleasure to release the publication of our conference proceedings book on Management and data analytics. This is a compendium of research papers presented at the International Conference on Management and Data Analytics at CMR University, Bengaluru on 20-21 October 2022. Your insightful contributions have made this publication a comprehensive and valuable resource for researchers, practitioners, and students in the field of management and data analytics.

This publication brings together research papers from experts, researchers, and practitioners from various fields to share their insights and experiences on the rapidly evolving world of management and data analytics. With the proliferation of data in today's digital age, organizations across industries are seeking ways to extract meaningful insights and drive value from their data. This book provides a platform for readers to learn about the latest techniques, tools, and best practices.

The editorial team has put in efforts to correct grammatical errors and spelling mistakes, but majorly the work is published without any major changes in content of papers. The authors are solely responsible for their opinions and findings published.

We believe that this publication will serve as a reference for future research and inspire new ideas and collaborations in the field. We would like to express our sincere gratitude to all the authors and contributors for their hard work and dedication in producing high-quality papers.

We thank all the directors, deans and management of CMR University for giving us the continuous encouragement and support provided throughout the process of publication.

We look forward to the release of this publication and are excited to see the impact it will have on the field of management and data analytics.

Chief Editor  
Dr.Sugant .R

Editor  
Dr. Om Prakash .C

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\* \* \* \* \*

# Social media marketing and its impact on consumer buying behaviour for Electric vehicles in Bangalore city

*Farhad Azizi*

Research scholar – CMR University

## **Abstract:**

*The swift transition from the web 1.0 environment to the dynamic and linked web 2.0 environment has brought about changes in the methods in which businesses exhibit their images online. Consumers are increasingly turning to social media not only to conduct research on various goods and services available on the market, but also to interact directly with the businesses that provide them with the goods and services they purchase, as well as with other customers who may have valuable insights regarding the operations of these businesses. At this point, there have only been a handful of comprehensive research projects completed on the topic of the customer behaviour of electric vehicles based on social media marketing. This inquiry will solely focus on the aspects of social media marketing that have a role in influencing the purchasing decisions of consumers, as those are the questions being asked. There is now widespread consensus, based on research conducted in academia as well as on observations made in practice, on the critical need of accelerating the growth of the electric car sector. This indicates that methodical research on the progression of the electric vehicle (EV) industry based on the description of consumer behaviour still has a lot of room for advancement in the future. As a result, the current study is an attempt to investigate how customers' electric car purchase behaviour is influenced by social media marketing methods. A descriptive research technique is going to be used in order to fulfil the requirements of this study. The researchers intend to obtain the data through the use of a comprehensive questionnaire that was adapted from earlier investigations. According to the findings of the literature review, the five most important aspects of social media are communication, characteristics, content, security, and reputation. The design of a questionnaire involves the use of categorical as well as continuous variables. Researcher confirmed the convergent and discriminate validity of the questionnaire in order to ascertain the scale validity and reliability of the instrument. For the purpose of the study, a convenience sample of one hundred fifty prospective purchasers of electric vehicles will be considered, with a margin of error of five percent and a confidence interval of ninety-five percent. Because there are several different aspects that go into social media marketing, Structural equation modelling using AMOS® will be utilized for the research. The findings of the study will be helpful to electric vehicle marketing units in devising strategies appropriate for the population of Bangalore city based on the effect of social media factors on consumer buying behaviour toward electric vehicles. This study's findings suggest that security, reputation, appealing material, contact, and communication are all crucial to the continued success of social media. The structural relationship shows that the social media marketing impacts the consumer buying behaviour by 55 % and this association is statistically significant.*

**Keywords: Social media, Marketing, Electric Vehicles, Consumer Buying behaviour**

## **Introduction**

Electric vehicles (EVs) have been suggested as a viable option for reducing greenhouse gas emissions (GHGs) from transportation and other sources of air pollution (Krupa, J.S., et al., 2016). The vast majority of industrialized nations are now implementing a wide range of government regulations and monetary incentives to promote the widespread use of electric vehicles. Much of the existing literature concerns itself with analysing the economics of EV advertising, where to put charging stations, and how customers will decide where to park their EVs. (Axsen, J., & Kurani, K.S., 2008), (Larson, P.D., et al.2014). There are four distinct types of electric cars (EVs), all of which are distinguished by the fuel technology they employ: plug-in hybrid electric vehicles (PHEVs), extended-range battery electric vehicles (E-REVs), battery electric vehicles (BEVs), and hybrid electric vehicles (HEVs) (HEVs) (Rezvani, Z., J. Jansson, and J. Bodin. 2015.)

While there is widespread agreement that EVs should be widely adopted, the advantages of doing so and making them a reality depend on people being open to adopting new technologies. 69 percent of American consumers, according to a 2008 poll (Axsen, J.; Kurani, K.S., 2008), know very little or nothing at all about the technology behind PHEVs. Additional study (Larson, P.D. & et al, 2014) confirmed that individuals would not accept premiums to switch to EVs. Another poll looked at consumers' openness and perspective on plug-in electric vehicles in key US cities to better understand the motivations behind their purchasing decisions. The findings showed that just a tiny percentage of people are interested in purchasing or leasing electric automobiles.

Much of the existing research in this field has focused on the consumer's perspective, desire, and attitude toward EVs, in addition to exploring other sociological or psychological factors on the uptake of EVs ( Egbue, O.; Long, S, 2012). The results demonstrated that EV-related attitudes, knowledge, and perception vary by gender, age, and level of education (Bunce, L., M. Harris, and M. Burgess, 2014). Public policies, financial incentives, and energy pricing were also cited as factors in the prior study that favoured EV adoption. Many earlier research also tried to probe environmental friendliness, technological savvy, and adaptability.

Rapid changes from a web 1.0 to a web 2.0 environment have led to shifts in how businesses portray themselves online, from so-called "dot-com" companies (where communication with customers remains one-sided) to a new model in which technology controls the content. There is a far-reaching impact on potential customers that marketing managers can have (Hanna et al., 2011) thanks to this.

In developing communication medium, social media is seen as a new marketing tool for promoting products and services (Hsu, 2012).

What we mean when we talk about "social media marketing" is the practice of utilizing social media channels for promotional reasons. Business-to-consumer (B2C) industries frequently employ social media marketing strategies, and the idea of social media as it relates specifically to B2C has been the subject of much research. According to (Weber, 2009), a marketer's function has shifted from that of a broadcaster conveying messages to a certain target segment to that of a corporation that works closely with its clients and takes part in online communities. Business-to-business (B2B) interactions are increasingly making use of social media (Bernof, 2009; Ramos, 2009).

To be more precise, the internet's ability to amplify consumer voices has resulted in a power shift. As a result, companies may no longer set the conditions of engagement in a discussion; instead, they must earn their customers' attention and earn the right to join the dialogue by providing content that is of value to them (Fournier and Avery, 2011).

More and more people are turning to social media to not only learn about the products and services they want to buy, but also to interact with the firms that provide those products and services and with other consumers who may have useful insights about those organizations

(Garretson, 2008). Because of the internet's capabilities—its interaction, breadth of reach, persistence, speed, and flexibility—companies see it as a platform to co-create value with consumers, lowering or even removing regional boundaries and physical distance (Shawhney et al., 2005). With this foundation laid, it will be possible to win over customers.

There have only been a handful of comprehensive studies done so far on how consumers act when faced with electric automobiles. This analysis focused solely on the factors that affect consumers' buying decisions in relation to social media advertising. Despite its involvement in consumer behaviour, it does not perform in-depth studies of consumer habits. There is widespread consensus, based on research and experience, that the electric car sector must be rapidly advanced. This indicates that there is room for expansion in the field of systematic research on the growth of the EV market based on the description of customer behaviour. Therefore, the purpose of this research is to investigate the effect of social media advertising on the purchase decisions of potential electric vehicle Buyers

### Review of Literature

Social Media Marketing Literature review	
Farook, F. S., & Abeyssekara, N. (2016).	The impact of social media advertising on consumer participation was analysed. Now more than ever, businesses need to know what makes their Facebook brand pages so compelling that visitors keep coming back for more. The information for this study came from surveys sent out to those who liked a certain brand's page on Facebook. The findings showed that the medium and content types of posts significantly affect customer involvement in online activities. Social media marketing's impact on consumer involvement was also highlighted. Five criteria were identified as having a major influence on consumer involvement, as shown by this research. Social networking sites (SNSs) provide an extra channel for disseminating data since they promote two-way dialogue between businesses and their target audiences.
Mohammadian, M., & Mohammadreza, M. (2012).	Marketing managers may use their company's social media to build strong connections with their consumers and foster loyalty. However, despite searching a variety of national and international scientific journals, the researcher was unable to locate any data supporting a model for social media success. As a result, we want to establish a framework for determining what makes a social media campaign effective. Using a questionnaire, factor analysis, and structural models, the researcher created this model with Allameh Tabatabai university students in mind. Positive effects of elements including security, appealing content, reputation, engagement, and communication were seen.
Dahnil, M. I., Marzuki, K. M., Langgat, J., & Fabeil, N. F. (2014).	As organizations and SMEs across the world increasingly turn to social media marketing as a new form of communication, academics and practitioners in the field of marketing have never had a better chance to conduct ground-breaking studies in this area. The goal of this study is to examine the existing research on what motivates small and medium-sized enterprises (SMEs) and larger organizations to engage in social media marketing. It helps people get a clearer sense of where the field of study on the adoption of social media marketing stands at the worldwide level right now. It also provides a helpful framework for assessing the kind of studies

	<p>that should be conducted to further knowledge in the related field of social media advertising.</p>
<p>Razak, S. A., &amp; Latip, N. A. B. M. (2016).</p>	<p>The goal of this research is to learn how various factors affect SME participation in social media marketing in Malaysia. Document analysis and scholarly literatures have been combed through extensively. The findings suggest a conceptual framework to explain the reasons why small and medium-sized enterprises (SMEs) in Malaysia utilize social media, and these reasons include the utility, simplicity, and enjoyment of social media. The findings of this research provide valuable data that can be used to guide the future social media strategies of SME owners and marketers.</p>
<p>Arango-Botero, D., Valencia-Arias, A., Bermúdez-Hernández, J., &amp; Duque-Cano, L. (2021).</p>	<p>Using the TAM, this research looks at what makes retail businesses more likely to implement social media marketing strategies. Identifying these aspects allows for the development of plans to maximize the marketing's potential in terms of client retention and expansion of the customer base. Despite what several writers have suggested, this research shows that the perceived ease of using social networks has little bearing on their actual utility. In addition, it permits restating the beneficial impact of Trust on the Perceived Usefulness construct and Perceived Ease of Use, both of which encourage the spread of advertising in social media..</p>
<p>Duffett, R. G. (2017).</p>	<p>The research found that teenage attitudes about social media marketing messages were positively affected across the board, but in a diminishing fashion that mirrored the buyer's journey. In addition, the data showed that the most positive attitudes about social media marketing communications were expressed by teens who utilized the platform for extended periods of time, regularly maintained their accounts, and identified with the racial categories of Colored and Black.</p>
<p>De Vries, L., Gensler, S., &amp; Leeflang, P. S. (2012).</p>	<p>Relationships with clients may be strengthened via the use of social media platforms. Constructing fan pages for the company on various social media platforms is one such method. Brand postings (including videos, messages, quizzes, information, and other content) can be placed on these fan pages by companies. Customers may show their support for a company by "liking" or commenting on content posted on the brand's fan page. To what extent brand postings are popular may be gauged by the number of likes and comments they receive. This article explores the factors that may contribute to a brand's post becoming viral. The results also show that the amount of likes and the number of comments are affected by many factors. Namely, the amount of likes on a brand's post rises when it contains certain features, such as vividness and interactivity. There is also a favourable correlation between the number of likes and the proportion of positive comments on a brand's post.</p>

<p>Al-Dhuhli, I., &amp; Ismael, S. (2013)</p>	<p>The proliferation of social media has provided consumers with several chances to modify various facets of their lives. Social media platforms such as Facebook, Twitter, and Instagram have played crucial roles in the rise of e-commerce. The evidence of its use is strong, despite the fact that Oman and other Arabian countries are struggling to make the most of their use of these sites. The purpose of this paper is to learn more about the demographics of Omani consumers who are influenced by online shopping, the factors that entice them to make online purchases, the products that are most frequently bought online, and the social media platforms that are most frequently used by these consumers</p>
<p>Voramontri, D., &amp; Klieb, L. (2019).</p>	<p>The purpose of this study is to conduct empirical research on the function of social media in the consumer decision-making process for complicated purchases, such as those with numerous brand options, high levels of customer engagement and risk, high unit costs, and low frequency of use. The model adapts the EBM classic's information gathering, alternative weighing, and final purchase decision phases. The study focused on tech-savvy shoppers in South and Southeast Asia and analyzed their online purchasing behavior.</p>
<p>Arora, T., Kumar, A., &amp; Agarwal, B. (2020)</p>	<p>This study aims to provide a conceptual model that examines the influence that aspects like the informativeness, entertainment value, legitimacy, interactivity, and privacy issues of advertising material have on the perspective of Indian millennial towards social media advertising. The findings pointed to strong correlations that might provide light on how young Indians react emotionally and behaviorally to social media ads. Marketers, advertisers, and brand managers may utilize the findings of this study to better create commercials for use on social media sites, increasing the likelihood that these advertisements will have the desired effect on consumers' views and, ultimately, their actions.</p>
<p>Ioanas, E. (2020).</p>	<p>Consumers may now do their own research on items, give them ratings, write reviews, and do much more thanks to the tools made available to them by technological advancements. As a result, many businesses now have profiles on social networks to supplement the knowledge held about items, possessed by the input of consumers about products, and the tendency to relate more to a firm after reading numerous evaluations.</p>

## Research Gap

To begin, compared to nations with very diverse populations, such as China, the United States, and the United Kingdom, India has conducted comparatively less research on electric cars. No studies have been undertaken to give managers in the electric vehicle sector with practical consequences from social media marketing, thus there is also a dearth of practical expertise.

## Objectives of the research

- To identify the awareness and usage of Social media for purchase of Electric vehicles
- To determine the successful social media parameters of electric vehicles and its impact on consumer buying behavior



●  
**Research Methods**

The goal of this descriptive study is to find out how social media marketing factors lead to a successful social media campaign. To reach its goals, the study uses both first-hand and second-hand information. Questions from the study of Mohammadian, M., & Mohammadreza, M. (2012) are considered for the study.

**Table 1- Questionnaire design**

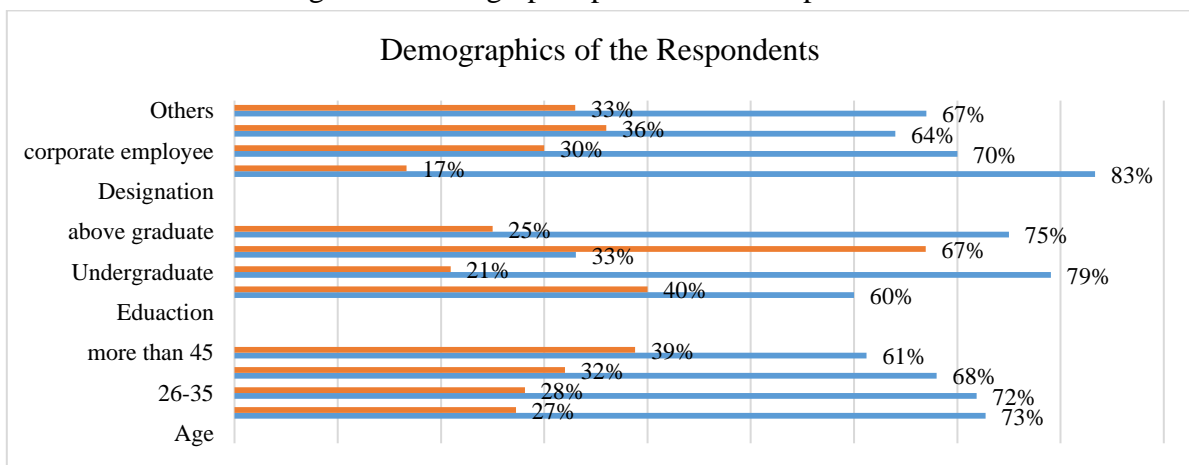
Description	No of questions	Type of Questions
Demographic Profile	3	Multiple Choice
Transportation profile	4	Multiple Choice
Awareness	5	Likert scale
Social media marketing	3*5 (15)	Likert scale
Consumer buying behavior	3	Likert scale

The master validity series was used to check the scale validity and reliability of the questionnaire, and it met the acceptable criteria. The sample for the study was made up of potential electric vehicle buyers who were chosen using the convenient sampling. Using the Cochran formula for an unknown population with 95% confidence and a 5% error margin, a sample of 100 people was chosen. To account for non-responses, the number of potential vehicle buyers in the sample was increased to 150. For the study, 120 Potential electric vehicle buyers were chosen after the outliers were taken out. The SPSS Ver 25 and AMOS Ver 22 programs were used to do the statistical analysis.

**Results and Discussion**

**Demographic profile of the respondents**

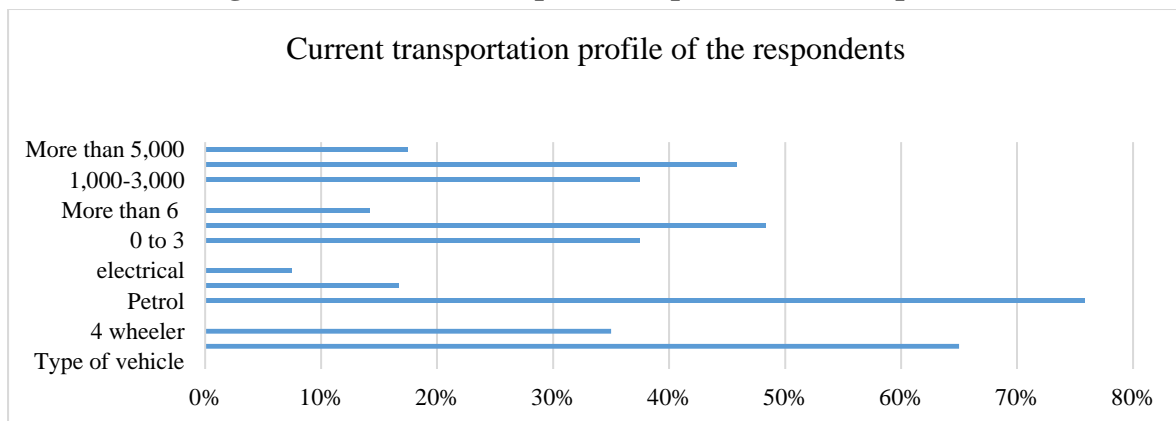
Figure 1- Demographic profile of the respondents



There were 67 percent of male respondents and 33 percent of female respondents in the survey. The respondents' ages, educational qualifications, and occupational designations are presented in the chart that may be found above. The survey has collected almost the same amount of responses from each age group, with 25 percent coming from the 16–25 age range and 18 percent coming from those older than 45. The majority of respondents, 55%, held a bachelor's degree or above; additional cross-tabulation revealed that just 33% of male respondents held a bachelor's degree or more, while 67% of female respondents did. The majority of those who responded were businesspeople who relied heavily on various modes of transportation in the course of their work. 45 percent responders were businesspeople.

**Current transportation profile of the respondents**

**Figure 2- Current Transportation profile of the respondents**



The respondents' current transportation profiles contain information such as the type of vehicle they possess; for example, 65 percent of the respondents owned two-wheelers whereas 35 percent of the respondents owned four-wheelers. To get about, the respondents' primary means of transportation was a gasoline-powered car in 76% of cases, while just 8% drove an electric vehicle. The majority of respondents, 46 percent, had automobiles that had been in operation for three to six years, and the majority of respondents spent around three thousand to five thousand dollars every month on gasoline expenditures.

**Awareness of Customers on E-Vehicles**

**Table 1- Awareness of Customers on E-Vehicles**

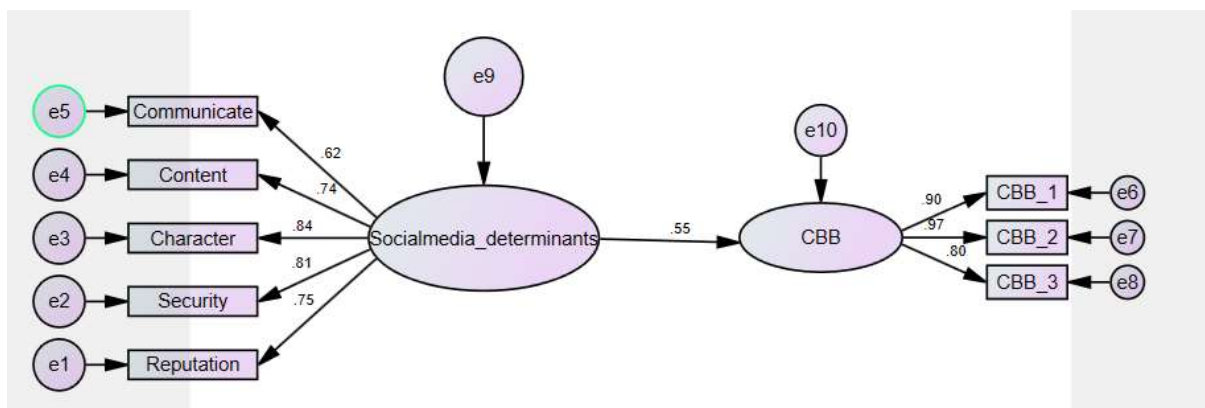
AWARENESS OF E- VEHICLES	Mean score
E-vehicles, as far as I'm aware, cut down on the emissions that cause global warming and pollution, so enhancing public health and decreasing the amount of harm done to the environment.	1.525
I'm concerned about the environment and, if given the opportunity, I'll work to improve it.	1.558
I believe that driving an electric vehicle offers a plethora of advantages, and I want to one day own one.	1.959
I am familiar with all of the initiatives that the government has taken in reference to electric vehicles.	2.133
In light of the increasing levels of pollution in metropolitan areas, I believe that electric vehicles serve their function.	1.667

The purpose of this series of questions was to elicit replies from consumers regarding their knowledge levels regarding electric vehicles (E-Vehicles). In order to analyse the replies, a three-point scale was utilised. 1 indicates not helpful, 2 indicates maybe, and 3 indicates quite helpful. The number of replies can be found in the table, and the percentage of total responses can be seen in the graph. To determine what the average reaction was from all of the respondents, mean scores were determined. E-vehicles lower the emissions that contribute to climate change and pollution, benefiting public health and minimising ecological harm, according to 62 percent of the respondents who acknowledged that they are aware of this fact. The majority of respondents (55%) felt that they were environmentally concerned and would like to take the initiative to do something about it. 46 percent of those polled had an adverse opinion towards the item Awr 4. When taken as a whole, the mean scores range between 1.5 and 2.00, which indicates that consumers have a moderate level of misunderstanding regarding the spread of electric vehicles.

Testing of Hypothesis

There is a significant impact of social media marketing factors on Consumer Buying behaviour  
 MODEL FIT - According to the Chi-square/df (2/df) value, the basic model fits statistics should fall below 3 (2.955). Goodness-of-Fit ratings improve when compared to the proposed features (0.871). An RMR of 0.071 is found to be within the limits. It is agreed that the model has passable accuracy.

**Fig 1- Pictorial representation of Structural relationship – Second order confirmatory factor analysis for social media determinants and Consumer Buying behaviour**



**Table 2 - Structural relationship – Second order confirmatory factor analysis for social media determinants and Consumer Buying behaviour**

			Estimate	S.E.	C.R.	P
CBB	<---	Social media determinants	0.548	0.198	3.51	***
Reputation	<---	Social media determinants	0.754			
Security	<---	Social media determinants	0.813	0.204	5.638	***
Character	<---	Social media determinants	0.836	0.179	5.788	***
Content	<---	Social media determinants	0.743	0.203	5.13	***

Communica te	<---	Social media determinants	0.624	0.235	4.255	***
CBB_1	<---	CBB	0.905			
CBB_2	<---	CBB	0.97	0.109	10.87	***
CBB_3	<---	CBB	0.799	0.142	7.657	***

## Social media determinants

### Communication

Many definitions of social media emphasize the importance of user participation and the importance of fostering open lines of communication and engagement. Historically, it has taken a lot of time and money for businesses to learn about the industry. People's actual shopping patterns, habits, and preferences may be accurately gleaned from their social media profiles. That's why it saves money and effort. Among the various aspects that affect a user's involvement with a social media platform, this one is crucial (Gunelius, 2011). In the current study as Communication factor increases by 1 time the success of social media factor increases by 62% (b=0.624, p=<0.005) and this association is statistically significant .

### Content

Disseminated data on social media the vast majority of those that specialize in social media say that social media is the most crucial factor when trying to make engaging content. That's why it's crucial for businesses to put in the time and effort required to provide engaging content for their websites or customers will just look elsewhere. People's time spent consuming and participating in engaging online material and conversations is not wasted. In the current study as Content factor increases by 1 time the success of social media factor increases by 74% (b=0.743, p=<0.005) and this association is statistically significant

### Online Character

Website or social media characters are an important part of keeping people interested in your social media and other internet-related content. Characteristics of social media that are immediately apparent include graphic design, ease of use, and website load times. In the current study as Social media character factor increases by 1 time the success of social media factor increases by 83% (b=0.836, p=<0.005) and this association is statistically significant

### Security

When discussing the topic of social media security, we are referring to the degree of personal danger that a user or citizen perceives throughout the course of their professional activities using social media. When it comes to direct sense, simplicity, and suitability for user completion of interactions with a website, Security is an interactive efficiency website. In the current study as security factor increases by 1 time the success of social media factor increases by 81% (b=0.813, p=<0.005) and this association is statistically significant

### Reputation

In this section, we will use the reputation of online sources to define the reputation of social media platforms. It's been established that the media's standing in the public's mind may have a significant impact on whether or not they retain their viewers and readers, and the same holds true for social. In the current study as Reputation factor increases by 1 time the success of social media factor increases by 75% ( $b=0.754$ ,  $p<0.005$ ) and this association is statistically significant

Of all the 5 factors, the social media security and social media character have the highest effect on the social media determinants.

### **Consumer buying behaviour**

A series of questions were developed with the intention of eliciting comments from consumers regarding their Purchase Preferences for E-Vehicles. Despite the fact that respondents unanimously agreed that electric vehicles have many advantages, over half of them (45%) stated that they did not intend to ever purchase one. The drawbacks of electric vehicles have proven to be more significant than their positive aspects. When looking at the scores as a whole, the mean falls between between 1.3 and 2.00, which indicates that consumers are rather divided about the acquisition of electric vehicles.

The structural relationship shows that the social media marketing impacts the consumer buying behaviour by 55 % ( $b=0.548$ ,  $p<0.005$ ) and this association is statistically significant.

### **Conclusion**

The power of social media to empower consumers. Businesses are participating to increase their channel count, reach a wider audience, strengthen relationships with current consumers, and promote traffic to their other marketing properties. As was noted before, social media allows for a two-way flow of information, and each platform plays a part in disseminating, receiving, and exchanging information beyond national boundaries. It is important to note that rejection, misinterpretation, and misunderstanding are possible pitfalls in the flow of communication because it affects not only how companies can access their target groups, but also throughout the entire decision process, from interpreting the message to searching for available alternatives to actions taken both before and after the purchase. The internet adds a new dimension of opportunity and challenge to the world of public relations (PR) and international businesses. It redefines the term "network" and the ways in which consumers and businesses interact with one another. Before the advent of social media, consumers had few options for taking their complaints beyond contacting customer service or word of mouth. This shifted with the rise of online social networking. Customers may now instantly share their honest opinions on businesses online. In addition, the rise of online social networks has thrown a wrench into the once-simple noble purchasing behaviour process idea, according to which consumers' purchasing attitudes are influenced by more than just traditional channels. Peer reviews, referrals, websites, interpersonal groups, and various forms of client-produced material all provide information that influences consumers' purchasing decisions and behaviour online but is outside the control of online advertising. Online communities have been greatly aided by the proliferation of social media sites like Facebook, Twitter, and YouTube. Direct marketing is an inexpensive strategy that puts businesses in touch with their customers directly. Brands and customers increasingly have an economic influence on the organization's strategy due to the increased variety of options available to them and the pervasiveness of social media marketing. The decisions made by consumers are impacted by social media. Consumers have an impact on other consumers. Repurchases are affected by these cascading occurrences, which

in turn influence future profits and the organization's long-term viability. Peer communication in online social networks is an additional kind of shopper socialization that has an impact on the dynamism and, by extension, the advertising processes itself. According to the buyer socialization theory, consumers' psychological, emotional, and behavioural dispositions are influenced by their interactions with other consumers. Current research is consistent with prior studies and is relevant to the Electric Vehicle sector.

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# Efficacy of Mid-Day Meal Programme of Akshaya Patra Foundation

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## **Proposed Research**

In June 2000, the Akshaya Patra Foundation launched its free midday meal programme in Bengaluru, Karnataka, serving 1,500 kids in 5 public schools. The programme has grown exponentially over the past 19 years thanks to the ongoing support of the Government of India, numerous State Governments, and allied organisations. 1.8 million school children are currently provided with free lunches by this organization in 19,039 public and government-aided schools. In India, the organization is currently present in 52 kitchens spread over 12 states and 2 union territories. This non-profit organization has been recognized as operating the largest midday food programme in the world.

The two biggest issues facing India are hunger and illiteracy. India is experiencing severe malnutrition, with the World Bank estimating that 60 million children there are underweight. Hunger is a barrier to children's survival, health, and education.

Akshaya Patra is committed to eradicating classroom hunger, increasing student enrolment in schools, and keeping students in school. By providing a hearty, nutritious mid-day meal every school day, you can (decrease the dropout rate). This is done in collaboration with the Indian Government and every State Government.

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# Opportunities and challenges in Tourism Marketing with special reference on selected destinations at Rural Bangalore

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## **Abstract:**

*Tourism is an important service sector in developed as well as developing countries in the world. This particular sector generates employment opportunities and adds up revenues to the country's national economy. The needs and wants of the customers are ever changing about the destination. Understanding the significance of this sector, it is very important to formulate proper marketing strategies with the aim of end users. Karnataka, the land of fragrance has all the ingredients of a great holiday and tourist attractions. The state is the eighth largest state in India both in area as well as in the population. Karnataka is famous for its natural beauty, a rich culture and heritage, pleasant climate, an incredible variety of rare species of flora and fauna, Forts, palaces, ruins, ornate temples and pilgrim centres, Hill resorts and many more. The miniature Indian state has plenty to offer and is rightly poised to be one of the best global tourist destinations of the world in the coming years. Virgin unexplored destinations in rural areas of Karnataka, Stable Government and efficient administration of tourism department, the tropical monsoon type climatic condition, communal harmony and many more add the strength of Tourism marketing at Bangalore tourism destinations. Whereas Poor access roads to many of the rural destinations, improper waste management, insufficient parking facilities, Limited awareness among local communities and misconceptions that tourism will bring environmental social problems are raising big challenges for the tourism marketing especially at the Bangalore rural destinations. With effective and efficient marketing strategies we can overcome the barriers and can have the best result in the tourist promotion. The research paper aims to understand the potentials of rural tourism destinations of Bangalore and enhance an understanding on the opportunities and challenges of tourism Marketing of the destinations at rural Bangalore.*

**Key words:** Tourism Marketing, Rural Destinations, Strategic Management, Opportunities

## **Introduction:**

Tourism industry in India is one of the most profitable industries in the country and contributes substantially to foreign exchange. Increased tourism in India has created jobs in a variety of related sectors, both directly and indirectly. Almost 20 million people are now working in India's tourism industry. India's tourism is thriving, owing to a huge surge in both business and leisure travel by foreign and domestic tourists. According to the latest tourism, satellite Accounting (TSA) research released by the World Travel and Tourism Council (WTTC) and its strategic partner Accenture, India's travel and tourism industry is expected to generate approximately US \$ 275.5 billion by 2018 (Gupta, 2006).

## **Objectives of the study:**

The research paper aims to enhance and understand the opportunities and challenges of tourism marketing in Bangalore rural destinations.

1. To understand the potentials of rural tourism destinations in the tourism markets.
2. To contribute to sustainable Rural tourism development in Bangalore rural areas .
3. To evaluate various obstacles and challenges in tourism marketing at Bangalore rural destinations.

**Need for Study:**

The focus of the study on Bangalore Rural destinations started with the realization that the rural sector was underdeveloped economically, socially, politically and needed social attention from Government (Subha, 2019), Public and private organizations to place it at the global level by making use of its natural resources.

**Methodology:**

Exploratory research approach has been adopted to conduct the study based on extensive Secondary data collected from various books, Newspapers, websites, articles and many more sources

**Scope of the study:**

Karnataka, rich with topography, scenic beauty is located in the southern part of India. The state has been ruled and shaped under the reigns of many dynasties including Mauryas, Satavahanas, Gangas, Chalukyas, and the Vijayanagara kings. The individual dynasties and rulers have uniquely offered distinctive arts, architecture, history and culture to the state. This land of fragrance has all ingredients of a great holiday and tourist attractions. This state is famous for its natural beauty, a rich culture and heritage, pleasant climate and incredible variety of rare species of flora and fauna, Forts, palaces, ornate temples and pilgrim centers, Hill resorts and many more. (S, 2013)

Holidays in Karnataka with colorful folk dances, art forms, the age old traditions and rituals, the literature and music are simply culturally enriching and make one pleasantly surprised at every single step. This miniature Indian state has plenty to offer and rightly poised to be one of the best global tourist destinations of the world in the coming years.

**Limitations of the study:**

The time and financial constraints didn't allow to cover entire destinations in Karnataka. The paper covers only the selected destination of Rural Bangalore district.

**Research Gap:**

The tourist destinations at different districts of Karnataka other than Bangalore Rural

**Strength and weakness of Bangalore Rural Destinations.**

The Common features of the destinations which add strength to Marketing process are:

- Presence of rich Flora and fauna, historical sports, royal palace, temples and heritage sites, hills, waterfalls
- Virgin and unexplored destinations in rural areas of Bangalore

- Adequate availability of infrastructure like power, water, communication and transportation
- Largely literate local community
- Brand image of Bangalore as IT hub all over the world.
- Stable government and efficient administration of Tourism department
- The climatic condition being a tropical monsoon type is a joy for the visiting tourists
- Land of peace and communal harmony

The Common features of the destinations which create challenges to the Marketing process are:

- The image of Bangalore as a technology capital of India, than a tourist destination among both domestic and foreign tourists
- Most of major destinations are stand alone and far off from city area of Bangalore
- Poor access roads leads to many of rural destinations
- Connectivity by land routes depend on private bus or taxi operators as public transport system and railway network are not up to the mark
- Limited awareness among local community and mis conceptions that, tourism will bring environmental social problems
- Limited financial networking within the state most of towns and destinations are yet to see ATMS'S and foreign money exchanges
- High risk perception or conservative attitude shown by private investors.

#### Some of the Famous Attractions at Rural Bangalore:

S.No	Destinations	Main Attraction in the destination	Main Drawbacks in the amenities at destinations
1.	Shivagange	Narrow and sharp climbing hills attract adventure tourists	There is no proper waste management system at the destination
2.	Manchanabele Dam	Destination offers evergreen nature beauty, Birding and land scape photography. The place attracts long riders with relaxing and soothing atmosphere.	Poor transportation facilities and accommodation at the destination

3.	Makali Durga	Hiking trails offers lovely view from top up	No shops near the trails for drinking water and snacks.
4.	Shree Nakoda Avati 108 Jain Temple	Pilgrims are attracted to this beautiful jain temple at Devanahalli. The main central temples is surrounded by 108 small temples.	No frequent transportation. Tourists have to depend private transportation
5	Sdahalli Quarry temple	This religious site is very attractive for its architectural style.	There is no proper guides to explain the history or architectural style at the destination
6	Devanahalli fort	The destination offers sightseeing, monuments, and statues. The place is famous as Tipu Sultan's Birth place.	There is no activities for children
7	Dee mandala Farms	This place offers fresh air and clam atmosphere away from the city. The organic fauna and numerous species of exotic Birds are are its main attraction.	The staffs in the farm are untrained to handle the tourists and knows only local language.

Table:1 Selective destinations at Rural Bangalore with its main attractions and draw backs  
Challenges in Tourism Marketing

1. Consumer Behavior:

Consumption pattern are changing globally as people are influenced by different aspects of environment. Tourism marketing is affected by demographic, geographical and cultural factors. These factors are important in finding out in more depth how to differentiate tourists may be a person's entrepreneurial orientation to risk taking activities or their propensity for new or innovative experiences. (A.S, 2004)

According to WTO, some of the 2020 future market trends are getting a change from active vacations to experience based holidays and an ever increasingly complex segmentation of the

demand to comply with the different objectives or purposes of traditional travel. Such as enjoying the sun and beach access, cultural or cruise related products. (Rao, 1992)

Cultural institutions such as heritage sites are virtually compelled to find additional sources of funding to improve their financial situations and ensure their long-term survival. One of the more suitable means of increasing the revenue situation on an ongoing basis is to improve and expand the cultural tourism offerings. (Hausman, 2007)

## 2. Brand Management:

Brand Management build economic value for both the consumer and the brand power. There are different types of brand that are used in tourism marketing from travel agents, companies advertising, tourism products such as hiking equipment to destinations like Canada being a brand. Hence there are a number of different directions that future research on branding in tourism marketing can take. (J.R.B, 2009)

## 3. E- Marketing and use of new technologies

Tourism business all over the world are currently facing rapid changes due to globalization identified competition, economic recession, and the dynamic evolution of new technologies. Use of new technologies facilitates tourism services in reaching their customers in offering customized services and competing effectively with other intermediaries and distribution channels. (watch, 2006)

Post modernity creates new challenges for tourism and tourism marketing. Tourism organizations are traditionally been slow in the adoption of innovations. Recent developments in marketing particularly the concept of life style and relationship marketing present new challenges not only to Geographical Information system (GIS) but more significantly to tourism marketing also. (Martin P Elliot, 2008)

Marketing Information system are an essential means for effective tourism marketing and improving quality of services of tourism organizations Most of the tourism organizations that have marketing information applications or tourism marketing services in place to support online marketing and transactions. To improve this situation, tourism marketing companies need to develop information technology -based marketing strategies in order to take full advantage of information system applications. (Eraque, 2008)

## 4. Strategic Marketing:

A lack of work on strategic issues and distribution process related to travel and tourism marketing has already been identified (Bagnall, 1996). The key reason for the issue is marketing for tourism service concentrate more on destinations than customers. (Williams, 2006)

The consumer needs are varying according to different conditions such as age, culture, purpose and many more. (Regie A.M, 2000)

## **Conclusion:**

The focus on rural development started with the realization that the rural sector was under developed economically, socially, politically and needed special attention from the government. Tourism is one of the most profitable industries in the developed as well as developing countries. This particular sector generates employment opportunities and adds up

revenues to the country's national economy. Tourism product is intangible. So that it needs effective marketing activities for the successful promotion. Many of the destinations at Bangalore rural areas offering scenic natural attractions. But lack of infrastructural facilities becomes a hurdle for the marketing activities. The involvement of Government, public, private sectors can resolve the problem to an extent in the development. The small initiative from the part of authorities can place the destination at global level. The effective marketing strategies giving importance to the consumer behavior pattern also plays important role in the promotion of destination.

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## Factors influencing consumer online shopping behaviour

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### **Abstract**

*Over the years, researchers have looked at shoppers' propensity to make purchases online and how they react in different scenarios. Researchers from many fields of business have made great strides in recent years, but there have been surprisingly few studies that focus on the connection between psychology and e-commerce. The purpose of this study is to offer a summary of the existing empirical literature and to provide a methodology for conducting future studies. We conduct a narrative assessment of research on consumer buying behaviour that has appeared in peer-reviewed publications between the years 2000 and 2022. The focus of this study is on how to quantify the degree to which consumers are invested in making buying choices. Not only does the suggested framework provide us a holistic perspective on the connection between psychology and online shopper behaviour, but it also offers researchers with a useful set of guidelines for further exploration in this field. This article finishes with a list of future research directions on the intersection of psychology and e-commerce. We suggest that the important ideas, external factors, and optimal study settings in the field of consumer buying behaviour are discussed in this review paper. This research contributes to the field of online shopping by illuminating the determinants of shoppers' actions. In order to better meet the needs of its consumers and boost sales, businesses need to be able to identify and understand the factors that influence their consumers. This will allow them to develop a strategy, a marketing message (Unique Value Proposition), and advertising campaigns that are more efficient and more in line with the needs and ways of thinking of their target consumers.*

**Keywords:** Consumer buying behaviour, online shopping, consumer attitude, e-commerce.

# Managing Shoppers' Perception Towards Digital Payment: An Empirical Investigation

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## **Abstract**

The digital payment in India is growing faster after the demonetization. In view of this, the present study aims to find out the relative importance of factors affecting shoppers' perception towards digital payment. Literature shows that factors like security, trust, benefits, usefulness, attitude, ease of use and self-efficacy drives shoppers towards digital payment. A questionnaire was designed and distributed to 400 shoppers, out of which 314 usable responses were considered for data analysis. The multiple regression analysis found trust, benefits, and self-efficacy are significant and positively associated with shoppers' perception towards digital payment. However, security, usefulness, attitude, and ease of use revealed insignificant. The study has focused on one city of India. To generalize the results this study should be extended to other cities as well in future research. The novelty in this paper is, first, that the traditional model has been tested quantitatively by using data from India.

**Keywords:** Digital payment, Demonetization, Ease of use, Trust, Security.

## **1. Introduction**

Today's digital payment has become a popular mode of payment by Indian shoppers. This is possible due to the growth of mobile and internet penetration in India, which facilitated the shoppers to pay digitally. Presently, there are 1000 million mobile phone subscribers and 300 million internet users in India and it is expected that mobile phone subscribers will be 1200 million and internet users will be 650 million by 2020 (Digital Payments 2020 – BCG Report, 2016). As per the study conducted by Sumanjeet (2009), the mode of digital payment has created new financial technology requirements that cannot be effectively fulfilled by traditional payment systems. Various vendors have emerged to meet the growing requirement of digital payment services by Indian shoppers.

According to the data by IMAP industry report (2016), India has been a cash-based economy in the past. The Indian currency in circulation accounts for 18 percent of the Gross Domestic Product (GDP) in comparison to 3.5-8.0 percent in the developed countries like the USA and UK. In India, cash accounted for 78 percent of total transactions in 2015, against 20-25 percent in matured economies such as the UK, France and Germany. But, during the last few years, the percentage of cash for transactions has been rapidly declining in India. The cash transactions in India were 89 percent in 2010 compared with 78 percent in 2015 (IMAP industry report, 2016). The Government's digital India vision, demonetization and easy availability of non-cash instruments such as cards and mobile wallets (Paytm, Mobikwik, Citrus, Freecharge etc.) is also aiding to the unprecedented growth in the digital payment, which includes both internet users and mobile phones subscribers. A Google-BCG report says, Indian digital payments industry will grow 10 times to touch \$ 500 billion by 2020, up from current estimates of \$ 40-50 billion and will contribute 15 percent of GDP. India represents one of the largest market opportunities for digital payments. With a population of 1.25 billion, India accounts for around 18 percent of the global population. A significant number of studies have looked at digital payment from the customer acceptance and technical perspectives (Rouibah, 2012; Chavosh et al., 2011; Ozkan et al., 2010; Sumanjeet, 2009; Elly and Kavishe, 2008; Rigopoulos and Askounis, 2007; Lim et al., 2006;



Patil and Shyamasundar, 2005; Mantel, 2000) and proposed a number of factors influencing shoppers toward digital payment. This paper is an attempt to find out the relative importance of factors affecting shoppers' perception towards digital payment in India.

The remaining part of the paper is organized as follows. The next part includes the review of literature and conceptual framework with respect to digital payment. Then, need of the study, objectives and hypotheses. The research methodology is described in next section, then analysis of data and results of the study. The paper is concluded along with implications, limitations and further scope of the study.

## **2. Literature Review**

### **2.1. Definitions of Digital Payment**

Digital payment can be defined as 'the payments made through electronic channel linked directly to deposit accounts' (Gans and Scheelings, 1999). According to Hord (2005), digital payment includes any type of cashless transaction that does not include a paper cheque. This paper followed the above definitions and refers digital payment as, the transfer of payment through an electronic channel that allows shoppers to access and manage their transactions (Sumanjeet, 2009; Lim et al., 2006) and digital payment also refers to financial transactions or exchange (Zhang and Jasimuddin, 2012).

### **2.2. Factors Affecting Shoppers' perception towards Digital Payment**

There are many factors which affect shoppers' perception towards use of information technology (IT). Shoppers' attitude toward a specific IT and its applications determine whether an individual uses that system (Davis, 1989). Attitude toward use of information technology is also determined by 'perceived ease of use' of that IT application. Shoppers' perception towards digital payment has a significant effect on its acceptance, and that depend on their attitudes (Abrazhevich, 2001). Eastin (2002) concluded that past experience in relation to adoption of IT had a significant impact on adopting a new IT service. In addition to this, there are other factors such as trust, security and efficiency also affects shoppers' perception toward digital payment. Based upon these backgrounds, digital payment is operationalized in this paper to understand the factors affecting shoppers' perception towards digital payment. The following sub-sections present the review of literature on the various factors affecting shoppers' perception towards digital payment in India.

Radhika R and Florence John (2016) explored that transparency, flexibility, affordable and user friendliness that affect customers' intention to adopt electronic payment systems in India. As per Lai Poey Chin (2015), convenience is an important factor to reduce the risk and to develop both ease of use and usefulness of digital payment that can lead to single platform digital payment system among Malaysian customers. Fatemeh Soleimani et.al (2015) measured the customer satisfaction and identified speed, efficiency, security, trust and accountability as the major digital payment tools lead to customer satisfaction and their outcome shows that there is a relationship between digital payment tools and customer satisfaction among the Iranian bank customers.

Niklas Arvidsson (2014) revealed 'ease of use' as one of the most important factors that affect Sweden consumers towards digital payment. In addition to this, low perceived security risks, high trust, lower income and higher age were positively affect digital payment service. Sanghita Roy and Indrajit Sinha (2014) explored that perceived usefulness, perceived ease of use, perceived credibility, perceived risk, and attitude influence customer towards digital payment. 'Perceived ease of use' is found to be the most important factor among these factors. The study conducted by Panda and Swar (2014) concluded that usefulness, ease of use, anxiety, and price influence online retail shopper buying behavior.

Wendy Ming-Yen Teoh, Siong Choy Chong, Binshan Lin, Jiat Wei Chua, (2013) indicated that factors like self-efficacy, ease of use, benefits, security and trust affect shoppers' perception towards digital payment in Malaysia. The results revealed that out of five these factors, ease of use, self-efficacy, and benefits significantly influence shoppers' perception towards digital payment system. Oyewole et al.

(2013) found that digital payment system positively associated with trade and economic growth in Nigeria. Zandi et al. (2013) indicated that high usage of credit and debit cards as a mode of payment leads to growth of economy, increase in efficiency and improve the consumption level in the economy. According to Mieseigha and Ogbodo (2013), the use of electronic payment is essential for accountability, transparency and reduction of cash related fraud in the economy.

The study conducted by Olusola et al. (2013) found that, a cashless economy experience a high degree of control, minimize crime, terrorism, human trafficking, illegal drug trade and corruption. Oginni, El-Maude, Hambo, Abba and Onuh (2013) stated that day by day digital payment is gaining shoppers' acceptance and there is gradual increase in the percentage of cashless transactions in the last couple of years in Nigeria.

Hasan et al. (2012) revealed that shifting to an electronic payment stimulates consumption, trade and overall economic growth. Manjit Singh and Robin Kaushal (2012) identified that customer convenience, innovation, incentive and legal framework are the major factors which influence shoppers to the adopt digital payment. In addition, they explores that digital payment is affordable, convenience to use, and also reduces risk.

In their study, Yaobin Lu, Shuiqing Yang, Patrick Y.K. Chau, Yuzhi Cao (2011) indicated that, 'trust' influenced shoppers towards digital payment services in China. Sevgi Özkan, Gayani Bindusara, Ray Hackney, (2010) demonstrated that three critical factors such as web assurance seals, security and benefits were necessary and other three factor like trust, perceived risk, and usability were sufficient to influence shoppers towards using e-payment system. A study conducted by Wai-Ching Poon, (2007) indicated that privacy, security and convenience affect users' acceptance of online payment services in Malaysia.

The summary of the most important factors that proved to have a significant influence for adoption of digital payments is presented in Table I.

**Table 1: Factors driving shoppers' toward digital payment services**

<b>Factors influencing shoppers toward Digital payment</b>	<b>References</b>
Security	Kim et al., 2009, Wendy Ming-Yen Teoh et.al., 2013; Niklas Arvidsson, 2014
Trust	Kim et al., 2009, Wendy Ming-Yen Teoh et.al., 2013, Fatemeh Soleimani et.al., 2015.
Benefits	Davis, 1989, Chou et al., 2004, Wendy Ming-Yen Teoh et.al., 2013.
Usefulness, Ease of use, Attitude	Davis et al., 1989.
Self-efficacy	Wendy Ming-Yen Teoh et.al., 2013.

**Source:** Compiled by the author

The following sub-sections present the conceptual framework of the factors affects shoppers' perception towards digital payment.

## **Security**

Security can be categorized into three areas with regards to digital payment such as system security, transaction, and legal. Digital payment will be confidential only when all the stages of the transaction are able to satisfy shoppers' need and their security expectations (Baddeley, 2004). According to Lim et al. (2006) in online settings, security refers to the perception of shoppers regarding various payment options and mechanisms for loading and transmission of information. Sathye (1999) finds that, security

can be an important obstacle to the use of online transactions, which affects the use of digital payments. Shoppers are generally concerned about their personal data, which are with the financial transactions facilities provider (Kobsa, 2001, 2002). Due to these reasons, security could be a factor which affects shoppers' perception towards digital payment (Abrazhevich, 2004).

## **Trust**

Trust is a significant determinant which influences shoppers' perception towards online transactions (Friedman et al., 2000; Wang et al., 2003). Due to this, many researchers consider trust as an essential factor during any financial exchanges which influence shoppers' perception towards digital payment (Tsiakis and Sthephanides, 2005) and subsequently its adoption (Lim et al., 2006). Most of the online transactions are prone to high degree of risk and uncertainty, hence developing shoppers' trust is the most important factor for digital payment (Zhou, 2011).

## **Benefits**

According to Chou et al., (2004), benefits significantly associated with the adoption of digital payment systems. Shoppers enjoy the benefits of low cost because they have to pay only a minimal service charge to their respective bankers while transacting online (Sonia San-Martin et al., 2012).

## **Usefulness, Ease of use and Attitude**

According to Davis (1989), Technology Acceptance Model (TAM) has been used as an important tool to understand user acceptance of information technology (IT). TAM framework consists of three major factors such as perceived ease of use, perceived usefulness and attitude. Perceived ease of use can be defined as the extent to which a user believes that new technology would not require physical and mental effort. Perceived usefulness referred as "the degree to which a user believes that a particular arrangement would enhance his or her job performance". Attitudes defined as "the users' desirability to use the system (Davis, 1989 and Karjaluo et al., 2002). Shoppers' attitude is also having a direct and positive impact on their intention to adopt new technology (Jahangir et al., 2008). TAM has been validated and used as a strong tool to understand the user's acceptance of technology (Porter and Donthu, 2006). Since online shopping is a retail format innovation and makes use of innovative technology, and online shopping behavior (e.g., browsing, transaction, etc.) is a type of consumer usage system, As, TAM provides a valuable base for research investigating shopper acceptance of online shopping (Ha and Stoel, 2009). Thus, this model has been used as one of the research instruments for the study.

## **Self-efficacy**

Self-efficacy refers to an individual's understanding and beliefs in his or her own skills and capability to do a job successfully (Dory et al., 2009). Previous studies showed that self-efficacy has significant effect on perception to use information technology (Luarn and Lin, 2005). Venkatesh and Davis (1996) believe shoppers' strongly anchor 'ease of use' perceptions about any information system to their computer self-efficacy. In the online setting, self-efficacy refers to the decision of the shoppers' ability to adopt digital payment services.

## **3. Need of the Study**

India is undergoing a stage of progressive development in terms of economic, demographics, shift in mode of payments, adaptation of plastic money, rise of fin-tech players, and m-commerce having a widespread reach. The study has arisen as there is a technological change in the usage of digital payment systems in Indian economy specifically after demonetization and in recent time's digital mode of

payment has become more popular among the Indian shoppers. Literature showed that very few studies have been done about factors affecting shoppers' perception towards digital payment and their relative importance in a retail setting (Ozkan et al., 2010) and most of the study conducted outside India. Now, it is motivating to examine in the Indian context because of the recent developments that are happening in the area of digital payments system. Moreover, the prediction that digital payment will grow at a significant rate in near future. Hence, the present study focuses to study the factors affecting shoppers' perception towards digital payment and their relative importance in India.

#### **4. Objectives of the Study**

1. To understand about the Indian digital payment industry.
2. To identify various factors affect shoppers' perception towards digital payment.
3. To find out the relative importance of factors affect shoppers' perception towards digital payment in India.

#### **5. Hypotheses**

H1: There is a significant and positive relationship between 'security' and shoppers' perception towards digital payment.

H2: There is a significant and positive relationship between 'trust' and shoppers' perception towards digital payment.

H3: There is a significant and positive relationship between 'benefits' and shoppers' perception towards digital payment.

H4: There is a significant and positive relationship between 'usefulness' and shoppers' perception towards digital payment.

H5: There is a significant and positive relationship between 'attitude' and shoppers' perception towards digital payment.

H6: There is a significant and positive relationship between 'ease of use' and shoppers' perception towards digital payment.

H7: There is a significant and positive relationship between 'self-efficacy' and shoppers' perception towards digital payment.

#### **6. Research Methodology**

The research was carried out by using a structured questionnaire, which contains seven factors influencing shoppers' perception towards digital payment. These factors were borrowed from different studies done in the past, i.e. security (Kim et al., 2009; Arvidsson, 2014), trust (Kim et al., 2009; Fatemeh Soleimani et.al., 2015), benefits (Davis, 1989, Chou et al., 2004), usefulness, attitude, and ease of use (Davis et al.,1989), self-efficacy (Wendy Ming-Yen Teoh et.al., 2013) and shoppers' perception towards digital payment (Wendy Ming-Yen Teoh et.al., 2013).

To collect the data, the study uses a four-point Likert scale, where 1=strongly disagree and 4=strongly agree. According to Garland (1991), by using four-point Likert scale we can eliminate social desirability bias. This will also help the researcher to drive more shoppers toward the positive end of the scale (Worcester and Burns, 1975). Further, research confirmed that by increasing the points from (five to seven to nine) on the rating scale that does not help us to improve the reliability (Elmore and Beggs, 1975). In addition, Kroh (2005) believes that by removing the midpoint we may compel shoppers to provide a confident answer.

## 7. Analysis and Findings

### 7.1. Validity and reliability analysis

The study collected data from 314 respondents based on the convenience sampling method. Before sending the final questionnaire to the respondents, the researcher has conducted a pilot study among 35 respondents in order to satisfy face validity. For all the factors the Cronbach’s alpha scores are more than 0.60, implying that the factors display reasonably high internal consistencies (Hair et al., 1998). The final questionnaire was circulated to the respondents after the reliability and validity test.

*Table 2: Mean and Standard Deviation scores for all the Factors*

Name of the factors	Mean	S.D
Security	2.69	0.909
Trust	3.29	0.884
Benefits	3.53	0.741
Usefulness	3.22	0.835
Attitude	2.98	0.895
Ease of Use (EOU)	3.36	0.748
Self efficacy	3.18	0.892
Shoppers’ perception towards digital payment	3.38	0.485

Source: Primary data

### 7.2. Mean and Standard Deviation Scores

Table 2 shows the mean and standard deviation scores for all the factors. The mean score of the factor ‘benefits’ was the highest, followed by ease of use, trust, usefulness, self-efficacy, attitude and security among the independent factors. The mean score of all the factors are more than 2.50; indicate that all factors are important for the shoppers. Consistently, the majority of respondents agree that ‘benefits’ are the most important factor with mean score 3.53, followed by ease of use and trust. Out of the seven factors, ‘security’ is having the lowest mean score, which confirm that shoppers are least concern about ‘security’ during digital payment. The standard deviation scores for all the factors are less than 1.00, demonstrating consistency in the shoppers’ responses.

### 7.3. Regression Analysis

Table 3 shows the results of multiple regression analysis with shoppers’ perception towards digital payment as the dependent factor. Multiple regression analysis has been used to attain the objectives of the research and to test the hypotheses. Table 3 provides the regression results with shoppers’ perception towards digital payment as the dependent factor. It is clear from Table 3 that trust, benefits, and self-efficacy are significant and positively associated with shoppers’ perception towards digital payment and they contributes 26.7 per cent, 13.4 per cent and 12.5 per cent respectively. The adjusted R square value of 11.1 per cent suggests high model fit. As such, H2, H3, and H7 were accepted. However, security, usefulness, attitude and ease of use are not significant. Therefore, H1, H4, H5 and H6 were rejected.

Multicollinearity and autocorrelation was done. First, the value of Durbin-Watson was 1.867. Second, the Variance Inflation Factors (VIF) were scrutinized and all were found to be (within the range of 1.025-1.102) less than ten and these factors can be considered for regression analysis (Chatterjee et al., 2000; Myers, 1990).

*Table 3: Regression Results*

Factors	Proposed effect	$\beta$ -value	Relative importance	t-value	VIF	Hypothesis result
Security	+	.012	7	.227	1.025	H1 was rejected
Trust	+	.267**	1	4.899	1.049	H2 was supported
Benefits	+	.134*	2	2.432	1.067	H3 was supported
Usefulness	+	.041	5	-.742	1.057	H4 was rejected
Attitude	+	.089	4	1.595	1.102	H5 was rejected
Ease of Use	+	-.040	6	-.724	1.091	H6 was rejected
Self-efficacy	+	.125*	3	2.303	1.033	H7 was supported
F value of the Model= 6.595** $R^2 = 0.131$ Adjusted $R^2 = .111$ Durbin-Watson= 1.867, Note: * $p < 0.05$ , ** $p < 0.001$						

**Source:** Primary data

**Dependent factors:** Shoppers’ perception towards Digital Payment

**Predictors:** (Constant), security, trust, benefits, usefulness, attitude, ease of use and self- efficacy.

## 8. Results and Discussion

This study conducted to find out the relative importance of shoppers’ perception towards digital payment. After the in depth literature review, the study has identified seven factors contribute to shoppers’ perception towards digital payment such as security, trust, benefits, usefulness, attitude, ease of use and self-efficacy. The mean and standard deviation scores of the factors have been estimated. The mean scores indicate that all the seven factors are important (as the scores are above 2.50) for the shoppers. The standard deviation scores reflect that the Indian shoppers’ perceptions are consistent in their responses towards digital payment. The value of multiple regression coefficients (R) between predictors and the dependent factor was 0.362. The R square for the model was 0.131, thus showing that the independent factors contributed to 13.1 percent of the reasons for using digital payment system.

The results of relative importance of factors affecting shoppers’ perception towards digital payment showed that trust, benefits and self efficacy are the three important factors and significantly contributing towards the shoppers’ perception towards digital payment. Out of these three, trust has the strongest influence on shoppers’ perception towards digital payment. The finding found support from preceding studies (Sevgi Özkan et.al., 2010; Niklas Arvidsson, 2014; Fatemeh Soleimani et.al., 2015) that ‘trust’ is the most significant driver of digital payment. The second strongest influence was ‘benefits’. This is much accordance with the outcome of the research conducted by (Chakravorti, 2003; Chou et al. 2004; Sumanjeet, 2009; Wendy Ming-Yen Teoh et.al., 2013). ‘Self efficacy’ found as the third strongest influence on shoppers’ perception towards digital payment. This confirms the findings (Eastin, 2002), since most of the shoppers believed that their positive service encounters motivate them to adopt digital payment system. ‘Attitude’ has the fourth strongest influence on shoppers’ perception towards digital payment. This finding is similar to the finding (Jahangir, et al. 2007; Sanghita et.al., 2014).

The fifth and sixth strongest factors which drive shoppers’ towards digital payment are ‘usefulness’ and ‘ease of use’ respectively. This confirms the previous studies (Lai Poey Chin, 2015; Panda and Swar, 2014). On the contrary, these findings were dissimilar to the previous findings (Sanghita et.al., 2014), where they indicated that ‘ease of use’ and ‘usefulness’ have the most significant affect on shoppers’ perception towards digital payment. In this case, ‘usefulness’ positively correlated but insignificant, where as ‘ease of use’ negatively correlated and insignificant. Moreover, ‘security’ has been found insignificant and the least important factor towards the shoppers’ perception towards digital payment. The result is consistent with past studies (Pavlou, 2001; Kim et al., 2009), it could be due to that Indian shoppers are accepting the initiatives taken by government, banking organizations and online transaction service providers to address the challenges related to security factor. Banking organizations

and online transaction service providers should send warning on regular basis and update shoppers regarding any incident of fraud. These steps may instill shoppers' confidence to adopt digital payment.

## 9. Conclusion and Implications of the Study

The current study examines the factors affecting Indian shoppers' perception toward digital payment. In recent times, there is a huge increase in the usage of digital payment services in India due to various reasons. The regression analysis results showed that, there are three factors such as trust, benefits, and self-efficacy, which positively and significantly motivating shoppers' perception towards adopting digital payment. On the other hand, security, ease of use, usefulness and attitude are insignificant.

The findings will allow the strategists to formulate appropriate strategies to support the banking institutions in sponsoring use of digital payment among Indian shoppers. Moreover, the results contribute to online transaction service providers and retailers to understand the Indian shoppers' issues and concerns while using digital payment. It provides insights to the digital payment service providers to allocate their resources accordingly, so that they can strengthen their payment system. This will certainly instill customer confidence to use more of digital payment services and through the process it may become a favorite medium for transactions in India. As per the study, trust, benefits, and self-efficacy are the three most significant factors influencing shoppers towards using digital payment; therefore these factors need extra attention from the bankers and online transaction service providers. They must give utmost importance to these factors while designing or upgrading the existing digital payment system. Specifically, bankers and online transaction service providers must ensure that the payment system is secure in order to instill trust and confidence among their shoppers. The findings on 'self-efficacy' imply that awareness among shoppers' should be created by providing demonstrations via video presentations at various bank branches or in the public places to show the features and educate them about the applications of digital payment services so that it can reach to wider group of target audience.

## 10. Limitations of the Study and Scope for Further Research

The study was conducted in Bangalore city and its surroundings. Also the sample was restricted basically to city where level of literacy is relatively higher. In order to generalize the findings future studies should be considered a larger sample size across different geographical locations. Future researchers may consider the demographic characteristics of the shoppers, to find out its relationship with the factors affecting shoppers' perception towards digital payment so that right target markets can be identified. The future research also can be extended to find out the differences between the shoppers' expectations and perceptions related to digital payment service so that a gap analysis can be done. The reliable and validated factors identified in the study can also be used to conduct similar kind of studies in other cities of India or across economies to confirm whether the findings are similar or different.

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## Effectiveness of Digital Display as an advertising channel: The role of depth of interaction in the Sale Conversion process

**Abstract:** *There is enough research on the effectiveness of digital display as an advertising channel. Data available previously did not allow researchers to go beyond the click to study the effects of post click behaviours and actions. All these studies, therefore, treat a click on the display/banner ad as a binary event. With advancement in data capture methods, there is availability of data that links a single user to many different clicks and allows us to study their post click behaviour.*

*This paper goes beyond the binary value of the click to study the subsequent actions taken by a user post clicking on a display/banner ad, referring to those actions as the depth of interaction, and testing if the depth of interaction is better able to predict the final outcome. A prescriptive research design was used in the study with a sample size of 100 randomly selected users, to model their exposure to the banner ads during the campaign, employing binary logistic regression analysis.*

*The results indicate that the depth of interaction is able to predict the outcome significantly better than just the clicks. There is a 45.6% jump in the accuracy of the model when independent variables representing depth of interaction are taken into account. This shows that the depth of interaction is better able to predict the final outcome as compared to just the click data.*

*The results also indicate that the device used, depth of pages visited, duration of time spent and recency of visit have a very high effect on the final outcome and controlling them can deliver better results to the advertiser.*

**Keywords:** Digital display advertising, banner advertising, depth of interaction, conversion funnel, sales conversion, logistical regression

# Data Analytics Reshaping the Future of Marketing

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## **Abstract**

*Emergence of Data analytics have changed the marketing function altogether. The Big Data has increased the potentials in marketing professionals leveraging upon the huge amount of data being generated and collected in real-time, around the clock, seven days a week. The marketers are having enormous information about their customers like, what their customers are preferring, exploring, viewing, buying, following or communicating about. Being able to intersect abundant amounts of data sets such as reviews, social media posts, money spent on promotional activities, etc, the marketing sector are able to identify and analyse which marketing synergies are more effective and profitable for the organization. The study aims to understand how Data analytics eventually transforms the marketing landscape and more specifically, how the future of marketing will be grounded in data and analytics. The main question discussed is how data is being quarried and what companies do with it. It is essential to explore the opportunities and challenges presented by this topic because as technology continues to grow at an ever-increasing exponential pace, in order to find new outlets and ways to survive and flourish as a business, industries must be able to adapt. The study will review the implications for organizations that intend to implement data analytics. Finally, turning to the future, the paper would identify trends that will shape marketing analytics as a discipline as well as marketing analytics education.*

**Keywords:** Data Analytics, Big Data, Marketing, database, digitalization, artificial intelligence, machine learning, consumer behaviour

## **INTRODUCTION**

Data analytics refers to the science of analysing raw data to arrive at certain strategic conclusions pertaining to that information. Since long several data analytics techniques and processes have been automated into mechanical processes and algorithms that perform on raw data for human consumption.

Data analytics is used in marketing field to study the gathered data and assess the performance of marketing efforts and activities. Marketers apply the data analytics technology and analytical

processes to marketing-related data to identify the factors driving consumer actions, refine their marketing campaigns and optimize their return on investment.

The global market is data driven and businesses analytical today. Either we predict our business impact and market on that or we go out of competition.

Organizations are increasingly turning to Business Analytics for marketing operations in order to get a competitive advantage and expand their businesses. A Forrester report explains the value of business analytics in marketing. According to this report, 44% of B2C marketers leverage big data analytics to boost response to 36% of their customers. For marketers, this means more potential for growth, effectively targeted campaigns, reduced stress factors, and so on.

Companies can collect big data about their customers in a variety of approaches in order to use it in their marketing. Data such as age, location, tastes, purchasing history, financial conditions, competition positions, and so on can all help you make better judgments in the future to attract more clients.

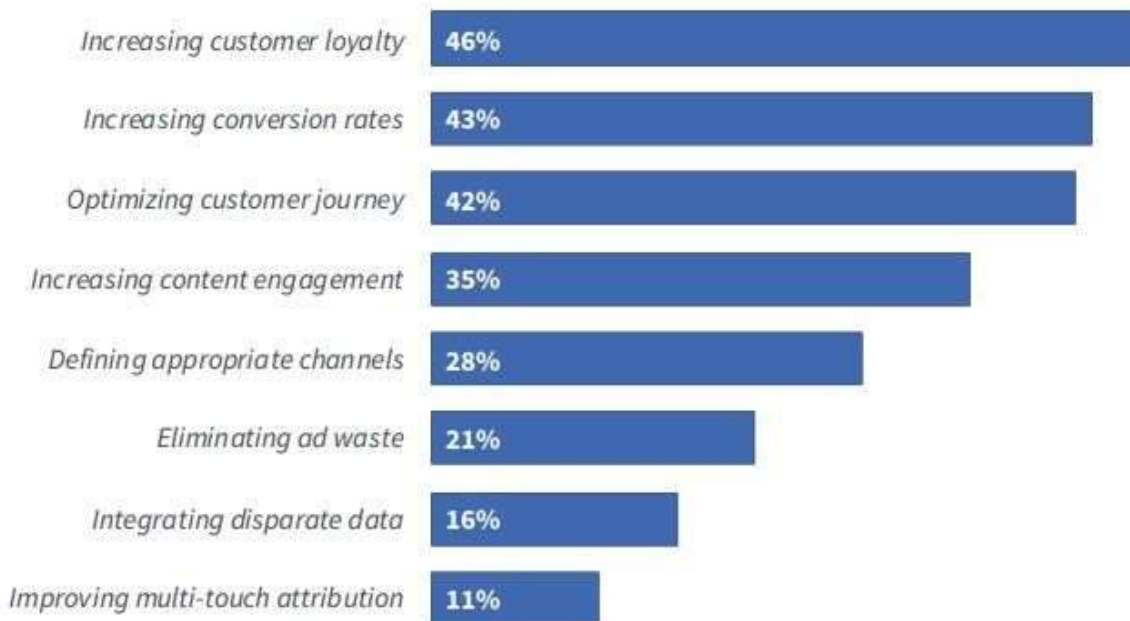


**Source:** <https://executive.timespro.com/blog-detail/how-strategy-and-analytics-are-shaping-the-future-of-marketing/>

## ANALYTICS AND MARKETING

According to Ascend2, 46% of brands rely on data analytics to boost customer loyalty to their brand. The same research shows that 43% of these brands gear their data management efforts toward conversions.

What are the PRIMARY OBJECTIVES of a strategy for using data to make decisions?



**Source:** <https://www.socialpilot.co/blog/marketing-data-analytics>

However, data from Gartner highlights marketing leaders' dissatisfaction with the success of their current strategies. Over 50% of senior marketing executives believe that their data analytics effort hasn't produced the expected impact.

Following the Gartner study mentioned above, businesses also report that their data findings often conflict with their objectives. Around 44% of them attribute this lack of consistency to poor data quality, while a further 43% believe that their data findings can't predict a clear pathway to success.

Hubspot also estimates that only 60% of marketers use customer relationship management software, with 82% of them focusing primarily on customer retention. The same Hubspot report shows that only 57% of companies shifted to hybrid marketing models in 2021. Although the adoption pace has increased as the pandemic lingers, most companies remain reluctant about pivoting from their established marketing frameworks.

In terms of social media marketing, most sales and marketing experts credit Facebook and Google search for their increase in sales. And most significantly, 76% of companies use automation in data analytics marketing, while only 46% use AI-empowered solutions.

Essentially, the current state of digital marketing data analytics leaves room for companies to improve customer experience and boost business productivity.

## DATA ANALYTICS AND TRENDING

### 1. *Strengthens Customer Relationships*

It's a well-known principle of marketing and profit-making that the better you know your consumer, the better you'll be able to identify their preferences and adjust price, content, and user interface accordingly. Any data expert can analyze Big Data which can lead to some very insightful findings. Knowing the customer and their preferences allows the marketing team to

better comprehend the customer's decision-making process before recommending a certain brand. This will allow the marketing team to customize and streamline the customer journey (Dey, 2022).

## **2. Brand Channeling**

Big Data is also collected from social media, so that the marketing team can monitor what is trending and modify their marketing plan accordingly. The marketing teams here are focusing on audience engagement. Big data also provides insights into the channels that are most effective at delivering the greatest results. This will allow the company to allocate resources to their channels in accordance with the marketing.

## **3. Analyse Competition**

Big Data can provide businesses with information about their competitors' prices and inflation rates over time, as well as enable them to understand the purchasing power of their brand's users so that they can stick to it without incurring any losses. Furthermore, the data on changing prices can aid the organization in developing new strategies to clear old product stockpiles during sales or make appropriate price decisions for new products that are intended to be launched in the market.

## **4. Brand Positioning**

Having information about a brand's growth and consumer base can benefit businesses in establishing their brand in the market among the ideal customers. This is the most well-known marketing technique, and it is similar to differentiation.

Knowing why your business is popular with which consumer can help in establishing the niche as well as developing a plan that represents the brand while also attracting the attention of other customers. Brand positioning can be done based on a variety of factors such as price, quality, target demographic, and so on, with the goal of gaining traction among a specific group. This type of marketing technique not only increases sales but also does foster market competitiveness.

## **5. Improve Return on Investment**

Finally, one of the most significant aspects of data and analytics is that they allow you to observe more than simply analyze how your efforts affect the bottom line of your organization. They enable you to track your progress at each stage of the client journey and assess the impact of each of your marketing initiatives separately.

All of this is to say that your marketing ROI does not necessarily have to be a conversion. Create different milestones that you and your team can track and analyze throughout a campaign or sales cycle, if you haven't already. You'll be able to see what works and what doesn't, as well as provide a more integrated plan and overall message to key stakeholders.

## **MARKETING ANALYTICS EDUCATION**

### ***Career as a Marketing Analyst: Skills, Certification, and Career Growth***

According to a recent survey, only 1.9% of companies believe they have the right people to leverage marketing analytics fully. There is a clear gap in talent, skill set and technical expertise that most companies are looking for.

### ***Key Skills Required for a Career in Marketing Analytics:***

Analysts need to be data-driven. They need to be proficient with marketing data analytics tools and marketing automation software. This includes Excel, Google Analytics, Salesforce, Marketo, Pardot, Tableau, SAP, Visual IQ, SEMRush, Hubspot, the social media stack of popular networks. They need to develop an understanding of AI, machine learning, and marketing stacks



Data visualization and immersive storytelling are crucial in marketing analytics. Analysts need to present big data, consumer trends, marketing demographics, and more through graphs. Market analysts need to be strong communicators with good creative thinking skills and problem-solving capabilities.

### ***Career Options in Marketing Analytics***

LinkedIn job search indicates around 76,000 jobs in the United States alone for marketing analysts in 2022. A report by Price Waterhouse Coopers (PwC) determines that over the next three years, an additional 2.7 million new jobs will be created in data science and analytics. Additionally, every industry be it entertainment, travel, fashion or manufacturing need analysts – the scope is that vast. A few popular career options for marketing analysts are:

6. Marketing analysts
7. Data analysts
8. Digital marketing analysts
9. Social media analysts
10. Business analysts
11. Marketing data analysts

According to Glassdoor, the average salary for a Marketing Analyst is \$73,954. PayScale confirms that an entry-level marketing analyst with less than 1 years' experience can potentially earn a base salary of \$51,209. While a mid-career analyst can earn an average compensation of \$68,230, an experienced one can earn up to \$76,794. One can grow to become a Vice President – Marketing, over the years.

### ***Marketing Analytics Certification and Courses***

Marketing analytics can be a creatively-fulfilling role with analysts exploring consumer insights and crafting rewarding marketing campaigns. Additionally, multiple industries are looking for analysts and a variety of career paths are open. A good course will only add a competitive advantage to your career trajectory. A career in this field requires a Bachelor's and/or Master's degree in business administration, specializing in marketing or business analytics. Data science courses and specialized marketing analytics certifications are also highly recognized.

## **DISCUSSION - THE PREVALENT MARKETING SKILLS VACUUM**

Customer-centric, value-driven, and hyper-personalised advertising is at the forefront of marketing strategies and priorities in today's marketing landscape. With so much raw data from social media sites, cookies and databases at one's disposal, digital advertisements in the form of short videos and atomised content tailored to individual needs has become possible. With the help of advanced techniques, marketers are able to engage with a wider range of audiences and create a sustainable brand image. This is a possibility that can be capitalised to a large extent with the use of analytical tools. In a country like India, which houses a large young population and is seeing greater internet penetration, it has become important for marketing professionals to efficiently utilise data to make marketing decisions that provide higher ROI and reach a wider audience.

In spite of organisations being committed to significantly investing in marketing technology to improve insights and gain better returns, a lack of trained professionals with analytical capabilities is preventing these investments from happening. Contemporary roles in marketing require skills like data proficiency, IT capabilities, web analytics, search engine optimisation, content management, paid media management, and UI/UX design, in addition to traditional marketing competencies. Since most conventional management programmes do not equip

professionals with such new-age skills and knowledge, companies often find it hard to occupy these roles. This severely impacts organisations as they are unable to realise their full marketing potential due to a shortage of upskilled talent. The ensuing skills gap causes intense turmoil between existing marketing professionals and contemporary market demands, which can only be resolved through rigorous upskilling of professionals to suit industry requirements. For professionals working full-time, short-term executive education programmes are a viable option to upskill without leaving their current job roles.

## CONCLUSION

The rapidly shifting contours of business with the advent of industry 4.0 have caused drastic changes in the marketing landscape. In 2020, digital marketing accounted for USD 340 billion, which is almost half the value of the global marketing industry. This illustrates how important modern means of marketing have become to organisations around the world. India is currently the fastest-growing industry for digital marketing and internet advertising, opening up novel challenges in addition to a diverse set of opportunities for organisations and marketing professionals alike. The increasing influence of AI-enabled technologies and big data enables informed decision-making in marketing. Leveraging these technological tools to mine big data can be immensely beneficial to organisations. Collecting, organising and analysing data with the help of automated tools allows marketers to design a more informed marketing strategy that is sure to achieve the intended outcomes. The significantly high returns on investment (ROI) provided by marketing analytics has made it highly desirable for organisations to hire upskilled marketing professionals to make their strategy more objective and streamlined. Backed by the surge in organisational appetite for big data, the marketing analytics industry is projected to grow at a rate of 14% in the 2021-2026 period.

Embracing marketing data analytics will give the company a competitive advantage and set up the marketing strategies for the future. By adopting automation, one can improve data reporting accuracy across all business processes.

It is need to focus on social media and mobile marketing to gather data from Gen Z and Millennials. Use of AI-powered CRM platforms for advanced data analytics in marketing has become paramount. And above all, tracking the relevant metrics for data analytics marketing focused on consumers is truly fundamental now.

Companies need to track their social media marketing performance with the help of a robust tool such as SocialPilot that will assist in automating their posts, assess their performance through detailed analytics and reports.

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## Post Purchase Cognitive Dissonance: A Review of Literature

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### ***Abstract***

*After making a purchase, customer will go through a post-purchase evaluation. The outcome many times leads to satisfaction or dissatisfaction. Customer dissatisfaction can sometimes lead to post-purchase dissonance. The post-purchase dissonance by a dissatisfied customer helps the organisation to understand the root cause of dissonance and helps to formulate an effective strategy, which in turn has a positive impact on reducing switching behaviour, diminishing negative word of mouth, reducing returns of product & cancelling orders, and improving the bottom-line performance. Through the paper, we tried to explore the various research studies on post-purchase dissonance by different authors.*

**Key words** – Post-Purchase behaviour, Post-Purchase evaluation, Post-Purchase Dissatisfaction, Post-Purchase Dissonance.

### **Introduction**

Social Psychologist Festinger (1957) developed the theory of cognitive dissonance. This is a psychologically uncomfortable state owing to an inconsistency between attitude and behaviour. This discomfort typically motivates people to act to reduce the inconsistency. Since its development, cognitive dissonance theory has been used in numerous studies in consumer psychology (e.g., post purchase dissonance).

The individual consumer has a complex set of deep-seated motives which drive him towards certain buying decision. They buyer has a private world with all his hidden fears, suppressed desires and totally subjective longings. His buying action can be influences by appealing to those desires and longings (Psychoanalytical model, Freudian psychology).

Cognitive dissonance which indicates the discrepancy between beliefs and behaviours is used to describe the feeling of discomfort that results from holding two conflicting beliefs. (Manoj kumar sharma, 2014).

When consumer experience psychological discomfort because of inconsistency between attitude and behaviour after purchase this inconsistency will negatively affect their judgement of a product/service and their pleasure in purchasing it. Post purchase dissonance decreases

likelihood of consumers to use product/service, or of choosing the product / service again. (ching-jui Keng & Tze-Hsien Liao, 2009).

Cognitive dissonance may be outcome when our cognitions and actions direct us towards different directions. Since the person assumes both cognitions to be true, it raises stress in their mind motivating the individual to make consonance in their uneven cognitions thereby bringing harmony to their psychological state. Cognitive dissonance may be influenced by several factors personal or impersonal. As dissonance experience is a psychological one, therefore it is imperative to understand the important personal factors that could shape the intensity of dissonance in an individual. (Mohit Jamwal & Akhilesh Chandra pandey, 2016).

Post purchase behaviour occurs after making the purchase and this involves all the consumer experiences and consumer will start evaluating his purchase decision and then move towards post-purchase dissonance. (Swagatika panda, 2014).

Post purchase dissonance occurs when customers feel unsatisfied or their state of mind becomes uneasy after making a purchase. Post purchase dissonance is one of the common issues faced by most of the marketers. It occurs when customers become dissatisfied with product they purchased. This type of dissonance may trigger customer to return the product and express their dissatisfaction. Post purchase dissonance result in purchase failure, where the customer starts regretting the purchase. (Sfwexperts.com)

## **Research Methodology**

Extensive literature review is done and same critically analysed out for the study.

## **Review of Literature**

A lot of researches have been done regarding consumer post purchase behaviour and post purchase dissonance. Few research outcomes are discussed here for a brief understanding about the topic.

Consumer behaviour can be divided into three stages. Pre-purchase behaviour, During Purchase behaviour and post-purchase behaviour. In the last stage post-purchase behaviour customer evaluates his purchase decision. During post-purchase evaluation many consumers may not be satisfied.

For Clarity of studies on post purchase dissonance the studies can be categorised into three steps. a) post-purchase behaviour

b) post-purchase dissatisfaction &

c) post-purchase dissonance.

## **Post Purchase Behaviour**

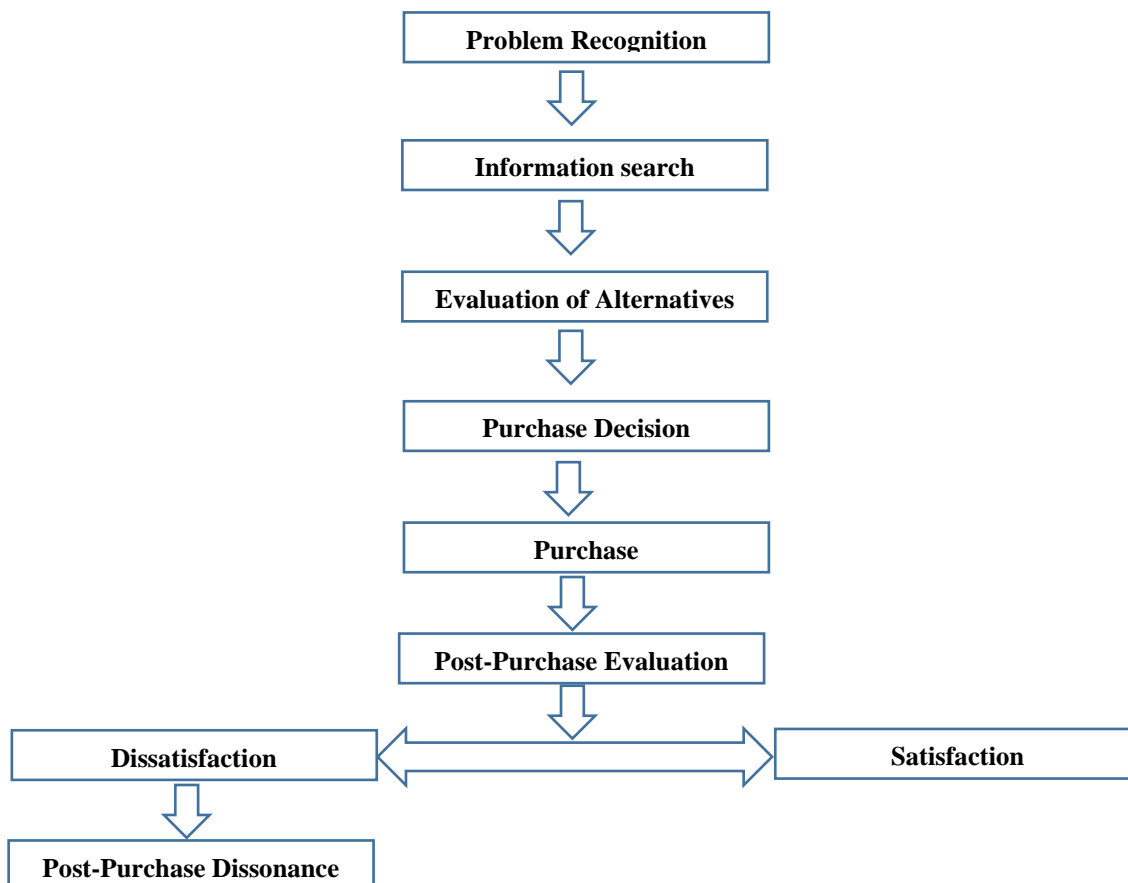
The term "post-purchase" often indicates the product or service acquired by the customer over a period of time. (Martin dahl, Martin keitsch & Casper boks, 2016)

Post-purchase behaviour is the behaviour shown by the customer after purchasing a product or service. At this stage, customers commonly experience cognitive dissonance. The customer is satisfied or dissatisfied but many times goes through post-purchase dissonance. If the customer is satisfied with his purchase decision, then repurchase intention will occur. The company can also make a profit in the long term, and customer retention also occurs. If the customer is dissatisfied with his purchase decision, then only one problem occurs: he will quit his purchase

and move towards another product, spreading negative word of mouth, etc. (swagatika panda, 2014).

Post-purchase behaviour is the stage that describes how the customer thinks, feels, and acts after they have bought something. Consumer purchase decisions go through different stages in a sequence like need recognition, information search, evaluation of alternatives, purchase decision, post-purchase use and evaluation. After all, after going through these stages, the customer will make the proper purchase decision and make the purchase. The next stage occurs with the post-purchase experience, which is the main priority. Consumer post-purchase behaviour may be positive, negative, or neutral based on their own purchase experience, which depends on the source referred to by the customer while making the purchase decision. After making a purchase, a customer is satisfied or dissatisfied, but the satisfaction level plays a very important role in brand building, retaining loyal customers, acquiring new customers through loyal customers, CRM, and further growth of business. (Meenu Rekha, 2021). The post-purchase analysis that consumers undertake depends on the importance of the product decision and the experience acquired in using the product. When the product lives up to expectations, the consumer will probably buy it again. When the product performance is disappointing or does not meet expectations, they will search for better alternatives. Thus, the consumer's post-purchase evaluation feedback to the consumer's psychological field influences similar decisions in the future. (Schiffman, wisenbilt & Ramesh kumar, 2019).

Stages of Consumer Buying Process.



Source – Global Journal of Finance and Management. (Manoj Kumar sharma, 2014).

### Post Purchase Dissatisfaction

Customer dissatisfaction appears when a product or service does not meet the customer's expectations or they come to know that their choice or the decision is wrong about the purchase. Dissatisfied customers are intended to stop making purchases with the seller, spread negative word of mouth about the product and seller, and engage in unnecessary negative advertising about the product and seller. They will then return the product and decide they will not make purchases with the seller in the future; they will complain to certain authorised bodies. (Mahapatra, Jitender kumar & Anand Chauhan, 2010).

Customer dissatisfaction has direct and indirect influences on the customer's repurchase intention and influences the negative outcome. This negative outcome will affect the customer's repurchase intention and also affect the future purchase decision. (Yunfan Lu, Yaobin Lu & Bin wang, 2012).

Consumer post-purchase behaviour requires large scale examination and analysis. In the event of any visible product-based malfunctioning or product failure, it could affect the customer's loyalty and build a negative impression in the customer's mind, which would affect the customer's repurchase intention and direct the customer towards the de-marketing of products and services offered by the concern.

Dissatisfaction will rise in the customer's mind if they do not get the immediate action or support for their queries raised and a positive response from the concerned party, which may lead to negative word of mouth and repurchase intention in the future. (Vikas uppal & Amit mittal, 2019).

Consumer Response to Dissatisfaction.

- 1) Take no action.
- 2) Discontinue purchasing of the product.
- 3) Complain to the company.
- 4) Complain to consumer court or other bodies setup for the purpose by the industry/trade associations or consumer associations.
- 5) Engage in negative word of mouth communication to other consumers. (Your article library.com)

### **Post Purchase Cognitive dissonance**

Customer while making the purchase in his purchase journey, he might be in a cognitive dissonant state throughout the journey, and he might not be happy and satisfied with his purchase decision and purchase. Some difference in cognitive dissonance among consumers is to be expected. (Jens graff, Kittipong & Vinit parida, 2012).

Customer post-purchase dissonance occurs when customers are not satisfied with their purchase decision or purchase, and their minds will not be in a constant state of dissonance. This occurs when a customer discovers the best option for the product or believes that his choice is incorrect.

Earlier research work suggested that dissonance will impact customers' decision-making processes and affect their attitudes, potentially leading to dissatisfaction with debatable ferocity and frequency. (Nadeem, 2007).

The cognitive dissonance can be measured in terms of some indicators such as psychological imbalance reactions following the dissonance arousal and the attitude towards the difference

between the chosen and unchosen alternatives that were indicated before making the purchase decision. (Sweeney, Hausknecht & Soutar, 2000).

Post-purchase dissonance will differ from person to person based on the information available and existing alternatives. The level of dissonance will not be constant. This is all linked to the psychological behaviour of the consumer and consumer personality, which indicates the underlying factors creating dissonance among consumers. (Uzma Hasan & Reshma Nasreen, 2014).

Post-purchase dissonance occurs when customers are dissatisfied or the satisfaction level is low. Post-purchase dissonance results due to some of the negative elements of service not consumed or not provided properly after purchase or positive elements of alternatives among the choices not consumed. (Martin O'Neill & Adrain palmer, 2004).

A person's psychological state can also be influenced by their surroundings or other external information available offline or online. (Shivani & Godwin 2018).

Consumer cognitions and feelings that lead to dissatisfaction after a purchase decision are made and that mutate into true dissonance when the significance of forgone alternatives changes during the purchase decision journey or is not considered in making the purchase decision. Dissonance in customers as two-dimensional aspects, both cognitive and emotional. Cognitive aspects indicate a person's recognition that beliefs are different after the purchase decision is made. The research was to measure dissonance at the post-purchase and pre-use stage of the decision process. (Sweeney, Hausknecht & Soutar, 2000).

After making a purchase, in the post-purchase evaluation stage, the customer will go through the dissonance stage. He thinks he has made mistakes while making the choices. Better alternatives can be chosen. In other words, they regret their purchase decision. (swagatika panda, 2014). An increase in dissonance may result in switching behaviour or a shift toward regret. (Mao & Oppewal, 2010). The discrepancy between what they want and what they have purchased may lead consumers in purchase regret.

## **Conclusion**

Consumer psychology has been the focus of research all over the world. (Mohit Jamwal & Akhilesh Chandra pandey, 2016). Current research in the marketing field thematises consumer behaviour largely with a focus on buying behaviour. (Martin dahl, Martin keitsch & Casper boks, 2016). From the studies explored, customers are important, but most importantly is customer satisfaction. If any customer is dissatisfied, it needs to be addressed immediately. After making a purchase, a customer will start evaluating the purchase. If a customer is dissatisfied with a purchase, it leads to post-purchase dissonance. The dissonance may lead or trigger the customer to regret the purchase, which leads to the following: returning the product, switching, negative word of mouth, purchase failure, and cancellation of the order. In the fast-growing marketing era, customer satisfaction is very important. Creating value with customer satisfaction is the main motto of the organisation. Most of the poor service and quality of products give rise to a post-purchase dissonance feeling in the mind of the customer. If a customer starts complaining about a product or service, you need to attend to the issue immediately and come up with a valid solution for the same. Ignoring the customer's issue will directly affect the sales and customer retention rate. To reduce post-purchase dissonance after purchase, educate the customer about the product after successful purchase, give detailed information about the product, quality, service, valid product review, and reasonable price. Offering this type of solution will reduce the feeling of post-purchase dissonance.



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# Health-Related Advertisements: Determinants and Its Impact on Consumer Behaviour

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## **Abstract**

*Health, being the top most priority, is getting its all-due attention from people across all age groups. Health and health-related marketing communications are ubiquitous in day-to-day life. Advertisements has its way of influencing the consumer behaviour either in consuming or purchasing. A lot of factors like colours, emotions, music, graphics and texts are curated to psychologically impact and influence the consumer behaviour. Each consumer is unique in responding to factors of persuasion. It is a very herculean task to list the common factors and measure their degree of impact. Though various media are used to advertise, many a times socio-cultural, personal, economical and psychological factors determine the ultimate consumer behaviour and their purchase decisions.*

## **Keywords**

Health-related advertisements, Psychology in advertisements, Consumer psychology, Consumer behaviour

## **Introduction**

Health-related advertisements are bombarded through various channels of media to impact and influence health-conscious consumers to buy the intended products and services. There is ever growing awareness on preventive health care and healthy lifestyle in all the age group of consumers, especially between 25–45-year-old who are educated, tech-savvy, affordable young people. This population group and children's health contributes to maximum purchases of health care products and services in the market.

All advertising campaigns use psychological aspect to create content with graphics, texts, visuals, colours and emotions to attract and influence the target consumers. These advertisements include music, catchy words and slogans to alter the beliefs, perceptions and needs of the consumers and induce them in buying products and services. Though consumers have sufficient knowledge about their needs and requirements based on their expectations and preferences, most of the times, they are carried away by the content and messages of advertisements.

Psychology used in advertisements are so powerfully created that it will attract attention, create an interest and desire to purchase the products and services. In recent times, most of the FMCG products and services use health and health-related messages in their advertisements. Impact of these advertisements on consumers and consumer behaviour will be an interesting topic to study to provide insight to stakeholders like, marketing managers, advertisers and consumers.

This study will touch upon the types and variety of health-related advertisements and the use of psychology in advertising contents and messages. Each consumer will have different mindset while looking at the advertisements and perceiving it. The study will focus on the impact of all such aspects which normally results in consumer behaviour.

### **Objectives of the Study**

Keeping in view of the importance of health and health-related advertisements which are widely spread across products and services, the primary objective of this study is to review the health-related advertisements and to evaluate the factors influencing consumer behaviour.

The sub objectives of the study are

- To review the growth and wide spread usage of health-related advertisements
- To understand the various psychological factors used in the health-related advertisements
- To study the different aspects of consumer psychology
- To bring out various determinants and factors affecting the consumer behaviour

### **Literature Review**

Following review/research studies have been chosen which are relevant to the study topic and the objectives of the study.

#### **Health-related advertisements**

**Marija Vukmirovic (2015) in his paper “The effects of food advertising on food-related behaviours and perceptions in adults”** found that most of the earlier studies showed positive relationship between food advertisements and food choices. The study revealed that women linger on the advertisements for a longer time and hence the impact is more while choosing the advertised foods. The findings concluded that image type and taste perception of consumers affect their purchase decision intentions. The result also shows a significant level of positive influence of healthy food advertisements on consumer and on their purchase behaviour.

**Brian Young (2003) in his article “Does food advertising influence children’s food choices?”** explains that most of advertisements contain attractive messages with graphics and design to influence the children on food choices. The study focused on critically analysing the claims and evidences of such messages. As per the study, children start understanding the advertising messages from the age of eight to nine years, although there may be limitations on

the application of the derived knowledge. The study concluded that children play an important role in influencing decisions on food choices in the family.

**Nele Geeroms, Verbeke and Kenhove (2008) in their study “Health advertising to promote fruit and vegetable intake: Application of health-related motive segmentation”** studied the advertisements which are promoting the consumption of fruits and vegetables for better health, and to identify the health-related motive orientations. The information was collected on the frequency of daily consumption of fruits and vegetables and their exposure to the targeted advertisements of the same. The study concluded that targeted advertisements had more impact in influencing the purchase behaviour than the generic advertisements. And also, these advertisements had more positive effect on the consumers who believe in health as energy and who value physical well-being.

**Megan E LoDolce, Harris and Schwartz (2013) in their paper “Sugar as part of balanced breakfast? What cereal advertisements teach children about healthy eating”** studied the children focussed advertisements of high-energy, low nutrient foods to understand the contribution of such contents to childhood obesity. The study covered the analysis of nutritional quality of the product, content of the message and exposure to such advertisements by the children. Study revealed that children are more exposed than adults to high-sugar ready to eat cereals as healthy choice. The messages exposed to children were more unrealistic, contradictory and misleading. The study concluded that children are more vulnerable towards advertisements containing emotional and promotional messages which may influence their food choices and may negatively affect their overall well-being because of consumption of such unhealthy foods.

**Nathalie Blanc and Brigaud (2014) in their research paper “Humour in print health advertisements: Enhanced attention, Privileged recognition and Persuasiveness of preventive messages”** studied the effect of humour, basically an emotional and psychological factor, in preventive health care advertisements. As per the author, previous research showed humour used in the ads attracted attention of consumer instantly and the message remained in the memory for a longer time. This study not only confirmed the same, but also revealed that such advertisements had longer attention and retention in consumer mind. Messages were more convincing and were well recognized by audience.

### **Psychology in Advertising**

**Bagozzi R.P and G.M (1999) in their paper “The role of emotions in marketing”** outlines an appraisal theory of emotions while studying the role of human emotions in marketing. Though emotions are the outcomes of beliefs, attitudes and moods, authors use these attributes as unique parameters to study the effect. Study also analyses the impact of emotions on cognitive processes, decision-making processes and on customer satisfaction. The study concludes that the role of emotions is vast in marketing and its effect and impact is spread across all the activities, from consumer response to consumer purchase behaviour.

**Mubeen M. Aslam (2006) in his article “Are you selling the right colour? A cross-cultural review of colour as a marketing cue”** evaluated the effect of colour psychology used in marketing communications. Colours and emotions, which are the psychological factors,

influence the consumer responses based on association and instincts. Every consumer will have preferences and likings towards different colours and these colours, used in marketing communications, can alter the meanings individually. This study reviews the socio-cultural and psychological associations along with meanings of colours in a cross-cultural marketing perspective.

**Kemp E., Bui M. and Chapa S (2012) in their paper “The role of advertising in consumer emotion management”** studied the effect of advertising on consumer emotions and on their decision-making processes. The study explores the consumption pattern by individuals, while managing their emotions and also the efficacy of stimulation process triggered through advertisements. The study concludes that the favourable emotional responses from marketing communication can build positive attitudes towards the brand and greater impact on purchase decisions of products and services advertised.

**Anjala Selena Krishen and M.B (2015) in their article “Fear advertisements: influencing consumers to make better health decisions”** studied the impact of using fear-based emotion as a trigger in health-related advertisements in inducing positive decision intention. Study findings suggest that fear-based marketing messages promoting non-indulgent food products can influence consumer purchase decisions and can increase customer satisfaction as every consumer wants to progress towards health one step at a time.

## **Consumer Psychology**

**Barbara Loken (2016) in her study “Consumer Psychology: Categorization, Inferences, Affect, and Persuasion”** evaluates the consumer psychology in relation to categorization, effect, inferences and persuasion based on marketing communications. This study touches on different factors of consumer psychology like brand preferences, goals, motivation, mood, attitudes, intentions and inferences which includes experiences. The research also looked into responses to advertising and evaluative dimensions. In conclusion, the study outcome emphasizes that consumer decision making process is complex and dynamic. Some of the important conclusions are: increased elaboration of positive and relevant information influences persuasion positively and information processing is dynamic when it comes to effective judgements.

**John A Bargh (2002) in his paper “Losing consciousness: Automatic influences on consumer judgement, behaviour and motivation”** analyses the unconscious influences on choices, behaviours and motivations in consumer purchase and consumption decisions as part of social cognition research. The study concludes that unconscious or subliminal influence attempts will continue to affect the consumer decisions and there is a need for consumer to be aware of such attempts and also to take control of decision-making process. The study outcome also states that subliminal influences are more powerful in affecting the consumer decisions than supraliminal ones.

**Griskevicius and Kenrick (2013) in their article “Fundamental motives: How evolutionary needs influence consumer behaviour”** evaluates the underlying motives for purchase, choices, preferences and consumption behaviour from an evolutionary perspective. As per author consumer decisions are based on some fundamental motives like physical needs,

social needs or status needs. The author emphasizes that consumer preferences, behaviours and motives in decision making process are based on which motive is dominant at that point of time and it may change according to situations and circumstances. The research concludes that consumer's fundamental needs are same everywhere and these have profound influence on preferences, motives, behaviour and choices.

**Sally Dunlop, Wakefield and Kashima (2008) in their article “Can you feel it? Negative emotion, risk and narrative in health communication”** study the emotional responses to public health marketing messages. As per the author, evoking emotional reactions to marketing communications can greatly impact in changing the attitudes, behaviours and intentions of the consumer. The study underlines the importance of emotional triggers used in the media messages for persuasion effect. As per the author self-referent emotional responses have direct and increased impact in motivating behavioural change in the consumer. The study concluded that “narrative” is the best and effective format of message which will evoke self-referent emotional reactions. The study conclusion also highlights the importance of influencing perceptions of personal risk in health communications to change behaviour of the consumer.

### **Consumer Behaviour**

**Jyoti Rana and Paul (2017) in their study “Consumer behaviour and purchase intention for organic food: A review and research agenda”** studied the factors affecting the change in consumer behaviour and purchase intentions towards organic food. Study found that health-conscious consumers prefer organically grown food to conventionally grown food. This change in the attitude and intention of consumers is greatly influenced by the rising numbers of lifestyle related diseases. The critical reasons for this shift are related to consumers' desire to improve quality of life combined with conscious awareness & affordability.

**Ike-Elechi Ogba and Johnson (2010) in their research article “How packaging affects the product preferences of children and the buyer behaviour of their parents in the food industry”** analyses the effects of packaging on children's product preferences and their influence on buying behaviour of their parents. The study found that product packaging has a direct impact on children's product preferences. The study also concluded that children influence buying behaviour of their parents, when it comes to food choices. The important revelation of the study result is that parents don't succumb to children's pressure when it comes to buying unhealthy foods.

**Study by Ramzan Sama (2019) in his study “Impact of Media advertisements on consumer behaviour”** analyses the impact of different media advertisements on consumer behaviour. Consumer purchase intentions and buying behaviours are strongly influenced by their exposure to advertisements. Advertisers use different media platforms to engage the customers in a distinct way to promote products and services. The study focuses on the impact of advertising messages of different media platforms like radio, television, newspapers, magazines and internet on different impact factors like awareness, interest, conviction, purchase and post purchase behaviour of consumers. The study results conclude that newspapers advertisements affect all the five stages of consumer behaviour whereas influence of TV and internet are more significant in creating awareness, interest and conviction in consumers. The study results further revealed that newspapers and magazines are effective media platforms in impacting purchase and post purchase behaviour of consumers.

**Cornelia Pechmann and Catlin (2016)** in their study “**The effects of advertising and other marketing communications on health-related consumer behaviours**” studied the effects of health-related marketing communications on consumer behaviour. Marketing communications are extensively advertising food and nutrition, tobacco and alcohol and prescription drugs on mass media. Promotional messages are displayed on the product labels also. Study results found that health-related marketing communications have measurable and significant effects on consumer emotions, cognitions and behaviours. The study recommends that marketers should tailor make the marketing communications to the target customers and test the impact of such messages for intended and unintended effects.

### Health and Health-related advertisements

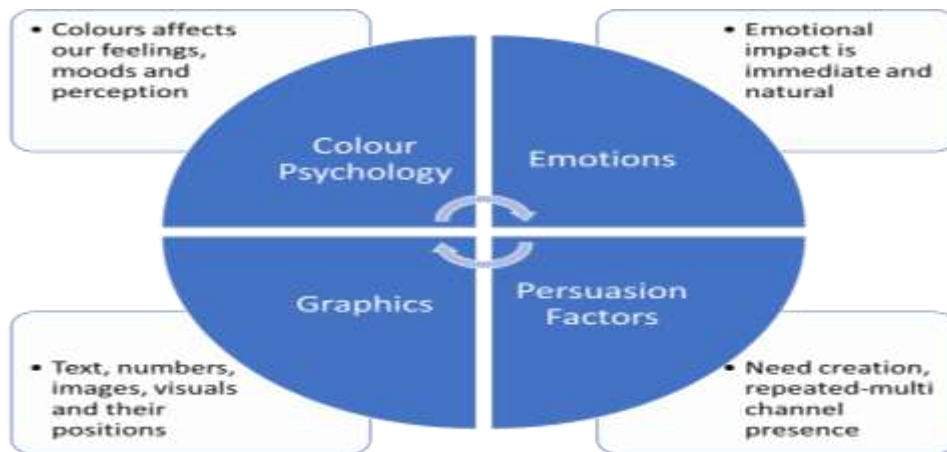
Health and health-related advertisements are ubiquitous in day-to-day life of consumers. Marketers and advertisers are using all the media channels to attract the attention of the potential health-conscious consumers towards brands and products. Health and health related words have become part of most of the advertisements in foods, vegetables, fruits, mineral water, fitness apps and wearable tracker devices which may or may not be directly connected to the overall health of the individual consumers. Health-related advertisements use different catchy words and phrases like:

Foods & Vegetables	Overall Health	New Gen Apps & Devices
<ul style="list-style-type: none"> <li>• Low/No Fat or Cholesterol</li> <li>• Low/No Carbohydrates or Calorie</li> <li>• No Artificial flavours or colours or preservatives</li> <li>• Organic, Fresh from Farm</li> <li>• Rich in Fibre, Low in Sodium</li> <li>• GMO Free, Gluten Free</li> <li>• No pesticides</li> <li>• Sugar free</li> </ul>	<ul style="list-style-type: none"> <li>• Immunity</li> <li>• Obesity</li> <li>• Bone Density</li> <li>• Weight Loss</li> <li>• Fitness</li> <li>• BP, Sugar, Diabetic</li> <li>• Healthy Lifestyle</li> </ul>	<ul style="list-style-type: none"> <li>• Healthyfyme</li> <li>• Step-set-go</li> <li>• Google Fit</li> <li>• Fittr</li> <li>• CureFit</li> <li>• Fitbit</li> <li>• GOQii</li> <li>• Mi Smart Band</li> </ul>

Sedentary lifestyle and unhealthy eating habits are resulting in premature health challenges. Factors like nutritional value and natural ingredients are playing a major role while buying the food products. Preventive health care and healthy lifestyle are the buzz words in health-conscious consumers. People are aware and concerned about lifestyle related health issues and searching for the information to take care at individual, family and community level.

### Psychology in advertising

Emotions are the basic trigger point of consumer to respond naturally to any stimulating marketing messages. Emotions acts as a mediator and moderator between events and actions. Colours and emotions are the most powerful, omnipresent psychological factors which are used in marketing communications, worldwide, since many decades. These psychological factors naturally influence the consumer responses based on association and instincts. Every consumer will have preferences and likings towards different colours and these colours, used in marketing communications, can alter the meanings individually.



As a way of managing emotions, consumers generally end up in buying or consuming the products and services advertised, whether they need it or not. Emotions has a greater role in influencing consumers’ decisions and purchase behaviour, hence advertisers are abundantly using fear, fun, pleasure, happy messages to promote health related products and services in all marketing communications. These messages not only create awareness and thoughts towards taking care of health but also initiating in investing available resources like money and time in such activities.

### Consumer psychology

Psychology of consumer is complex & unpredictable; hence marketers are always trying to look for innovative ways to understand the consumer and tailor make marketing messages to reach them for the intended result. Consumer psychology also have different contributing factors like brand preferences, perceptions, goals, motivation, mood, attitudes, beliefs, intentions and inferences which includes experiences.

Most of the times, consumers are unaware of impulse buying behaviour and they cannot rationalize it because they may not be in control of such actions. Though most of consumer choices are consciously made, which are influenced by motivation, beliefs, attitudes and preferences, marketers cannot neglect the unconscious decisions which may not be based on thoughtful deliberations. Fundamental motives of consumer, like physical needs, social needs and status needs have significant influence on preferences, choices and buying behaviour.



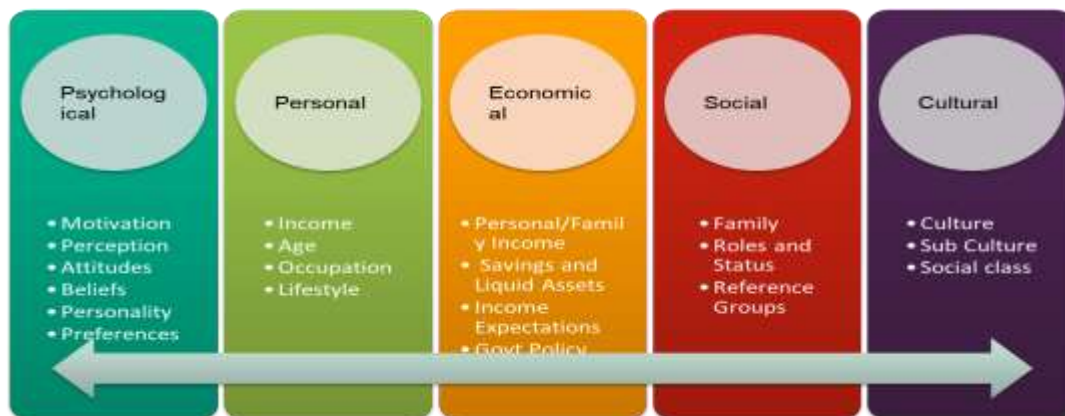


Every consumer is unique in terms of attitudes and beliefs, perception and preferences, needs and motivation. It is a puzzle for marketers to identify the factors affecting consumer purchase decisions. The difficulty is in finding the gap between what consumer say and do. Consumer psychology is complex to understand because it involves multiple factors which cannot be measured by any tool. Still marketers are using different creative ways to reach consumer mind through effective advertising campaign.

### Consumer Behaviour

Taking care of health is the primary focus and priority for health-conscious consumers and this is an emerging trend in the recent years. Consumers are aware of the fact that life style diseases like blood pressure, diabetes and heart related disorders are the result of prolonged consumption of unhealthy foods. This knowledge and awareness have greatly influenced the attitude and intention of consumers towards consumption of organic and natural foods. The critical reasons for this shift are related to consumers’ desire to improve quality of life combined with conscious awareness & affordability. Marketers try to influence the consumer buying behaviour in all possible ways from product attributes to pricing to designing the package.

There is a growing concern about children’s food habits and related health effects like childhood obesity. Health-related marketing communications have measurable and significant effects on consumer emotions, cognitions and behaviours. Few messages encourage healthy consumption and some other communications may influence unhealthy eating habits. Effect of marketing messages depends upon the message content, choice of media and the message execution. The effect also majorly depends upon consumer characteristics and background. Different factors that affect consumer behaviours are:



Consumer purchase behaviour is a very complex and multidimensional process which ultimately results in buying the products and services for consumption or use. All the efforts of advertisements are to stimulate, impact, and alter consumer mind to get the sales growth. Understanding consumer behaviour helps in knowing how consumers take decisions with their available resources like time, money and effort while making purchases.

### Findings and Suggestions

1. There is a positive relationship between food advertisements and food choices. There is also a significant level of positive influence of healthy food advertisements on consumers and on their purchase behavior. Hence advertisers and marketers need to use authentic, truthful and honest messages while advertising and promoting healthy foods.
2. Children play an important role in influencing decisions on food choices in family. Children are more vulnerable towards advertisements. Unhealthy food advertisements, targeting children, may negatively affect their overall well-being because of consumption of such foods and beverages.
3. Targeted advertisements have more impact in influencing the purchase behavior of consumers than the generic advertisements. Humorous advertisements have longer attention, more convincing, well recognized and received by the consumers.
4. The role of emotions is vast in marketing and its effect and impact is spread across all the activities, from consumer response to consumer purchase behaviour. Global marketing strategies should consider the cross-cultural perspective while using colours and emotions in marketing communications, as these are associated with cultural values in society.
5. Favourable emotional responses from marketing communication can build positive attitudes towards the brand and greater impact on purchase decisions of products and services advertised. There is a constant need for increasing the effectiveness of health-related marketing communication with proper use of emotions and message frames.
6. Health-conscious consumers prefer organically grown food to conventionally grown food. This change in the attitude and intention of consumers is greatly influenced by the rising numbers of lifestyle related diseases. The critical reasons for this shift are related to consumers' desire to improve quality of life combined with conscious awareness & affordability.
7. With respect to advertising media choice, newspaper advertisements affect all the five stages of consumer behaviour like awareness, interest, conviction, purchase and post-purchase behaviour, whereas influence of TV and internet are more significant in creating awareness, interest and conviction in consumers.
8. Marketers and advertisers should tailor make the marketing communications to the target customers and test the impact of such messages for intended and unintended effects.
9. Consumer decision making process is complex and dynamic. Increased elaboration of positive and relevant information influences persuasion positively. Information processing is dynamic when it comes to effective judgements.

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## The Future of Regional OTTs in Digital Era in India

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### **Abstract**

*The current century is witnessing a digital revolution. Digital technology has made it accessible and possible to get services at consumer doorsteps. Technoid is getting the services with one click on their smartphone. According to Indian telecommunication market statistics, India has emerged as the World's second-largest Telecommunication network with 1.16 billion subscribers. It had the highest internet subscribers, 780.27 million, during the first half of 2021 (IBEF, 2021). Advances in digital technology have changed the rate at which information spreads. At this juncture, people can access infotainment content handy. Theatrical and Television experience has shifted to digital. Theatre content is available on digital platforms. TV shows on their phones or computers by Over-the-Top (Popularly known as OTT). The regional OTT platforms came up with an alternative model to the theatrical and television screening with weekly new releases and native content such as Aha; Telugu regional OTT has launched 'Every Friday new release with the title of the program as 'Aha Puram' and Talk shows with Regional Super Stars and Web Series with nativity themes. Regional streaming platforms lead the entertainment industry worldwide with the highest subscriptions from regional language audiences. During the COVID 19 pandemics, regional OTTs have registered a rapid growth rate in India. Desi streaming platforms such as Jio cinema, Sonyliv, Zee5, and others have competed with global services like Amazon Prime, Netflix, and Hotstar. This technological swiftness and audience behavior have boosted the regional OTT industry's growth to cater to the restricted audience's needs with the nativity infotainment flavor. Regional OTT platforms such as Aha, Add times, Hoichoi, and Dollywood Play, emerged as leading regional OTT streaming platforms. The media and entertainment industry report shows that OTT has a 7-9% market share. However, by 2030, its market share is predicted to extend to 22%-25%. In this context, this research study aims to study the future of the regional OTT movie business in the digital era by reviewing the secondary quantitative data adopted by the content analysis methodology.*

**Keywords: Digital content; Digital releases; Film business; Regional OTT**

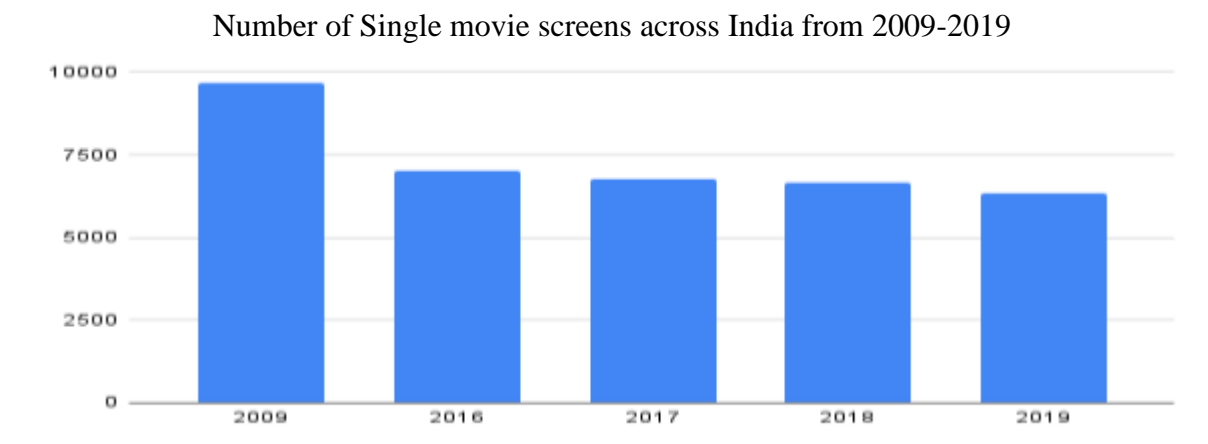
### **Introduction**

The new media age is the most significant change in human interaction. Standard devices have evolved into communication channels and have established connections worldwide. The leading communication technologies for sending messages are radio, television, telephone, movies, and the internet. Cinema is the most powerful communication tool because it educates the public about many things in a very approachable and comfortable manner. Moviemakers have adopted several techniques to release their movies; theatrical release is popular. As technology has evolved, movies are being released directly through digital platforms.

**Theatre Release**

Films were originally filmed on celluloid and sent to movie theatres in grey tin cans for projection. Still, digitized technology is the new trend sweeping the film industry across the World. The producer doesn't want to send film reels across the country in this projection. Virtual projection involves filming through a computer system or DVD in the cinema hall; instead of a film projector, digital projectors are used for screening a movie. The first analog to digital projection began in 1999 with Star Wars:1. The movie is digital on two screens in North America, which has transformed cinema viewing across the World. In India, the companies like UFO, PXD, QUBE, etc., started their digital projections in 2006; about 400 theatres in India were digitized that year. The Malayalam movie Moonnamathoral (2006) is the first Indian movie screened digitally in India. According to the Filmfed survey, there are 9675 single and 3200 multiplex screens in India; now, every theatre has switched to digital projection.

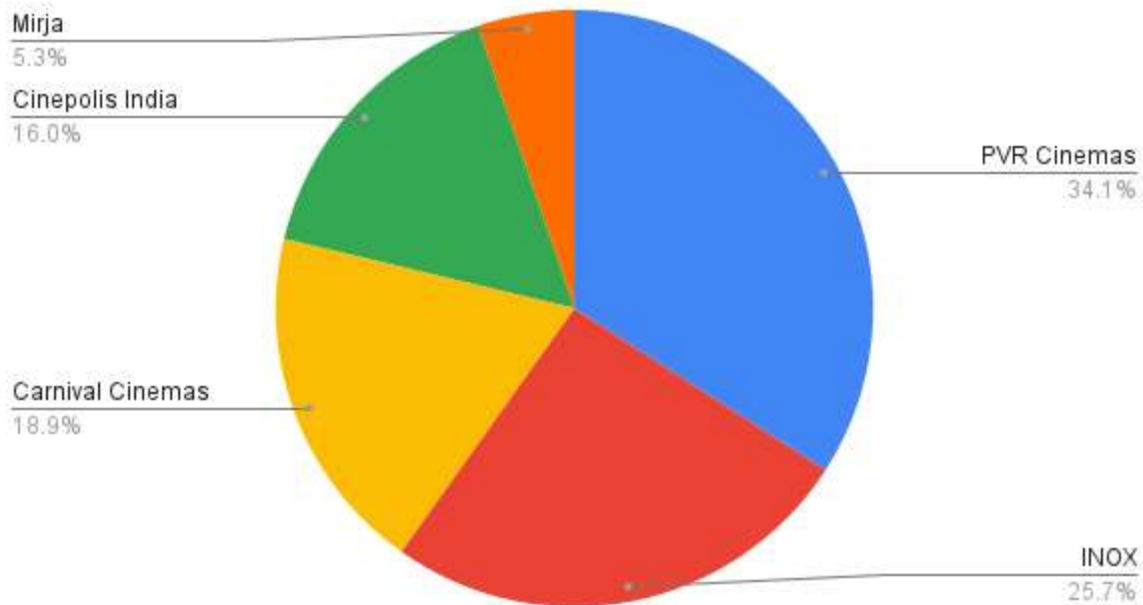
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From 9675 screens in 2009, Indian single cinema screens have dropped to just 6327 by 2019. This decline is reflected in the country's screen density, which stood at 74 in 2019. With the uplift of multiplex theatres, research proposes that creating movies that serve upper-class audiences could be one of the points for decreasing numbers (Statista Research Department, 2019).

Image-2:

Number of multiple screens across India in 2019



While there were only 925 screens in 2009, by 2019, the number of multiplex screens across India had increased to 3,200. The most prominent players in the multiplex chains are PVR Limited and INOX Leisure, with 1,400 in 2019 (Statista Research Department, 2019). As per the report given by live mint, more than 1500 cinema halls in India were shut down after the first COVID wave due to poor business. OTT platforms played a vital role during this pandemic and attracted the audience to watch content on their platforms.

### ***OTT Services***

Over-the-top services (OTT) deliver the content to the audience through the internet without cable or satellite television connections. The COVID 19 pandemic has changed our way of watching films; now, OTT platforms are our new mini cinema halls to watch movies. The recent developments in internet connections have significantly impacted our Traditional media like television and Print because the OTT platforms came into existence. With these OTT platforms, you can access your content anytime, anywhere. The growth of digital devices is creating a massive demand for these OTT platforms across the globe. During this pandemic, the usage of OTT platforms by the audience is very high because theatres are being shut down in India. In 2020, India's paid subscriptions exceeded 50 million for the first time (FICCI, 2021). There isn't any regulatory frame in India that controls streaming content material for OTT platforms.

For this reason, there is a massive demand for original OTT content in India. Global video streaming platforms like Netflix, Amazon Prime, YouTube, Hot star, VOOT, ZEE5, Alt Balaji, etc., are making huge profits in India. According to the new India Online Video & Broadband Distribution 2021 report published by Media Partners Asia (MPA), India's OTT platform generated US \$ 1.5 billion in revenue during the pandemic. India has over 60 OTT platforms, and out of these top platforms, Amazon, YouTube, Hotstar, and Netflix accounted for a combined 85% share of revenue in 2020. The percentage of regional language usage on OTT platforms will cross 50% of the total revenue by 2025 (FICCI, 2021). There is no limit to the digital presence these days to find digital devices, even in small villages in India. The consumption of regional language content through OTT is very high. During the pandemic, the consumption of regional OTT gained a lot of subscribers. Until 2018, there were two to three

pure-play regional OTT services. There are over 15, with many more slated to launch in 2021(Sohini Mitter, 2021). Last year, the regional OTT platforms expanded into Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Tamil Nadu, and Telangana. Some of the popular regional platforms are Addatimes (Bengali), Aha (Telugu), DollywoodPlay (Hindi), Hoichoi (Bengali), Koode (Malayalam), Neestream (Malayalam), Oho Gujarati, Olly Plus (Odia), Planet Marathi OTT (Marathi), Reel Drama (Assamese), Sun NXT (Tamil, Telugu, Malayalam, Kannada, Bengali), Talkies (Tulu, Kannada).

According to Google reports for 2020, 90 percent of people prefer searching in their language. It has impacted the selection and decision of the people for everything, including OTT viewing. "The pandemic has accelerated the expansion of OTT at an unprecedented rate because people are spending longer and thus trying to seek out content to enjoy (Abhishek Sharma, 2021). According to the FICCI-PwC report, the share of regional language usage in OTT platforms will cross 50% of the total time spent by 2025, reducing past Hindi to 45%.

**Table - 1:**

**The list of popular regional OTT's in India**

S.No.	Regional OTT	Language	Year of Launch
1	Addatimes	Bengali	2016
2	Hoichoi	Bengali	2017
3	Sun NXT	Tamil, Telugu, Malayalam, Kannada, Bengali	2017
4	Aha	Telugu	2020
5	Dollywood Play	Hindi	2020
6	Koode	Malayalam	2020
7	Neestream	Malayalam	2020
8	Olly Plus	Odia	2020
9	Planet Marathi	Marathi	2020
10	Talkies	Tulu, Kannada	2020
11	Oho Gujarati	Gujarathi	2021
12	Reel Drama	Assamese	2021

### Review of Literature

A study by Quresh Moochhala on "The Future of Online OTT Entertainment Services in India" highlights that the key to unlocking the digital market in India is to focus on regional content as the number of viewers of programs in English is low. This study also says that OTT streaming platforms offer Indians a new alternative to traditional cable television and cinema. Entertainment is in the process of being rebranded as digital entertainment at the fastest pace in India.

Mr. Nandani Parikh, in his study titled "The emergence of OTT platforms during the pandemic and its future scope," says that The pandemic led to the explosion of over-the-top video

streaming services in India last few years have seen the emergence of different patterns of content usage. It also highlights how OTT platforms have accomplished significant inanimate growth by taking up the market share of other platforms.

The study conducted by Anu Manoj on "Content regulation and censorship: OTT platforms" says that consumers' viewing habits have evolved a lot in the last few years. The consumption of short-form video content on smartphones and social media platforms is increasing, followed by viewing programs on various OTT platforms, which are widespread. This study also highlights that the pandemic has led to a global shutdown and has survived the entertainment industry by shifting focus to OTT platforms.

Mr. Garima Sharma Nijhawan, in his study titled "Role of COVID as a catalyst in increasing adoption of OTTS in India: A study of evolving consumer consumption patterns and future business scope," says that COVID 19 is enabling the continued consumption of online video content. All sources point to the increasing duration of video consumption year on year, and COVID 19 has played a role in the ongoing change.

Amid the rise of evolving distribution models for quality films, cinema viewing is no longer the main route. According to an article by Mehra, filmmakers are reconsidering their distribution strategies in ways that bring new audiences on board while reducing costs. Artificial intelligence-generated website marketing content "brought enthusiasm," proving more beneficial than traditional advertising methods. However, OTT has only seemed to gain more viewers since the pandemic hit.

### **Objectives**

1. To study the future of the film business in the digital era in India.
2. To explore the role of OTT platforms in the digital age.
3. To examine the usage of regional OTT platforms in India.
- 4.

### **Methodology**

The study has been designed as qualitative research by critically conducting the descriptive analysis of the published reports of Indian regional Over-the-top OTT platforms. Primarily the study has conducted primary data collection systematically to study quantitative information to understand the qualitative approaches in the film business. Based on their subscription success rate, over ten regional OTT platforms have been identified as study samples. The content analysis method is used to gain better insights into the future of the film business in regional film industries in India during the digital era. A descriptive evaluation of the literature of each movie release in the regional OTTs has been analyzed systematically based on analytical factors such as the number of releases in a month, model of releases in a week, and rise of subscription of each OTT in a year.

### **Results & Discussion**

#### ***Addatimes (Bengali)***

Rajiv Mehra launched Addatimes, an Ex Indian Air Force Officer, in 2016, and it is one of the fastest-growing Bengali entertainment OTT platforms in India. Now it has entered the Bangladesh market to entertain audiences, with an aspiring target to reach 5 million subscribers in one year. This streaming platform offers original web series, live sports, new movies, short films, and live sports to attract the local Bengali audience. They are getting revenue in two ways one is from paid subscriptions, and the other is free ad-watching. The paid subscription



plans are INR 599 for two screens and INR 399 for one screen with 1-year validity. In Bangladesh, the subscription plan is INR 299 for one year.

### ***Aha (Telugu & Tamil)***

Arha Media & Broadcasting started their Telugu OTT service as "Aha" on February 8, 2020; Aha has 1.5 million paid subscribers within a year. Now Aha has 6 million active users, and 13 million have downloaded this app from Play Store and App Store. On February 18, 2022, Aha announced its Tamil services with the new web series 'Irai.' Initially, Aha started its services with two subscription plans INR 199 for three months and INR 365 for a year. Recently, Aha announced some upgraded version programs like new movie releases and celebrity talk shows with 'Nandamuri Balakrishna' as host every Friday. Globally, 100 million Telugu-speaking audiences are there; 50 million regularly watch online content. Aha succeeded in getting 15% of Telugu speaking audience. The USA is the big market for the Aha OTT, with 5% of the subscribers being from the USA; these subscribers benefit by paying 50\$ for an annual subscription and 8\$ for a monthly subscription.

### ***Dollywood Play (Hindi)***

Dollywood Play was founded by Wamindia and Digital Convergence companies, and these two companies were dealing with online content. This company launched its application on the google play store during the pandemic, witnessing one million-plus downloads. The Dollywood Play OTT platform mainly deals with South Indian and Hollywood movies dubbed in Hindi, and it has crossed one lakh plus subscribers

### ***Hoichoi (Bengali)***

The Bengali media company SVF Entertainment Pvt Ltd launched their OTT platform Hoichoi on September 20, 2017. During its launch, Hoichoi had an impressive subscriber base of 1 million, and it aimed to double its size in two years, but due to the pandemic, it crossed 13 million subscribers. Most of the content on this platform is free, and viewers want to take subscription plans to enjoy premium content. The paid subscription premium plans are like INR 599 (1screen) for one year and INR 899 (2 screens) for one year. Now Hoichoi has expanded its services in Bangladesh.

### ***Koode (Malayalam)***

Studio Mojo launched its first independent Malayalam OTT platform in December 2020. Koode means 'With You.' Koode is the first OTT platform in the country with iStream. Koode provides high-quality Malayalam content like original web series, Films, Travel shows, lifestyle, and short films. Most of the content on this platform is free of cost. This platform adopted a pay-per-video model for movies and premium content. It costs INR 99 per movie if you book in advance or INR 149 later if you pay later. Now Koode has four different types of subscription plans such as Koode premium, which offers premium content for 365 days at INR 1000; Koode special plus, which offers premium content for 90 days at INR 300; Koode super, which offers premium content for 30 days at INR 140, and Koode kids which offers premium content for 90 days at INR 100.

### ***Neestream (Malayalam)***

US-based company NeST Technologies Corp. started their Malayalam OTT streaming service Neestream in Malayalam. They have started their services in Malaysia, Dubai, and other

Southeast Asian countries with large Malayali populations. This OTT platform streams all major Malayalam television channels round the clock. Neestream plays many Malayalam films on-demand, pay-per-view movies, original web series, cookery shows, and talk shows. It has three different subscription plans monthly, semi-annual, and annual. The price of the Neestream premium monthly plan is INR 210, the semi-annual plan is INR 1050, and the yearly plan is INR 1750. In addition, Neestream offers essential content for free to all registered users.

### ***Oho (Gujarati)***

Oho Gujarati is a premium OTT platform containing Original shows and Movies; it was launched in May 2021 and has reached over 5 lakh plus downloads. Oho Gujarati has two plans INR 499 per year and INR 99 per month. Oho Gujarati came up with releasing Oho originals every ten days. This platform streams Gujarathi lyric videos, award-winning classical films, oho original movies, non-fictional dramas, and staged performances of Gujarathi.

### ***Olly Plus (Odia)***

In 2020 during the pandemic, Sk line production started their new Odia OTT platform Olly Plus. This platform presents its content in the Odiya language, including short films, video songs, Oriya films, and comedy videos. The main objective of the starters is to bring global recognition to the Oriya film industry. More than 10000 people have downloaded the Olly Plus application globally, and they are charging a nominal fee for a subscription.

### ***Planet Marathi OTT (Marathi)***

Akshay Bardapurkar started the first Marathi language OTT platform Planet Marathi in 2020. He started this OTT platform along with Singapore-based Vistas Media Capital. The main catchphrase of the platform is to present original Marathi language films, web series, cookery shows, theatre, fiction, and non-fiction reality shows. The creators came out with the idea of the 'first day-first show' feature, where viewers want to pay a one-time amount for watching their favorite film for one day. Planet Marathi has over one lakh downloads, and their subscription plan is INR 365 per year, where you can watch the original content in full HD.

### ***Reel Drama (Assamese)***

Hyderabad-based Production House Reel Drama Production Pvt Ltd launched its new OTT Platform Reel Drama in the Assame language on January 2021. Reeldrama offers a wide range of original Assame content like short films, devotional programs, cookery shows, and web series. In addition, reel Drama focused on kid's programs that contained grandma tales and animated moral stories. To date, it has 50000+ downloads on the Google Play Store, and Reel Drama has two different subscription plans: INR 299 Quarterly and INR 990 Yearly.

### ***Sun NXT (Bengali, Kannada, Malayalam, Tamil, Telugu)***

Sun TV Network launched its OTT service in 2017 under Sun NXT. In this OTT, subscribers can watch all Sun Network television channels, comedy videos, music videos, reality shows, and new movies in four South Indian languages - Tamil, Telugu, Malayalam, Kannada, and Bengali. According to reports, Sun NXT has two subscription models, i.e., a basic plan with ads and a premium plan with no ads. The preliminary plan access is limited to one mobile that does not have casting and offline downloads, priced at INR 50 per month and INR 480 per year. With the premium plan, subscribers can access content on mobile and large screens with

a maximum of four accesses at once, priced at Rs 99 per month and INR 799 per year. S L Narayanan, company chief financial officer of Sun NXT, said Sun NXT had reached 20 million unique subscribers. The significant benefits of the Sun NXT app are that we can get new content every month with a full HD streaming option, and subscribers can use the same account on multiple devices at a time.

### ***Talkies (Tulu, Konkani, Kannada)***

Swayam Prabha Entertainment & Productions launched the Talkies OTT platform on April 14, 2020. It was Completely Ad-Free streaming at an affordable price of INR 199 for three months and INR 99 for one month. Talkies stream their content in four local Karnataka languages- Kannada, Tulu, Beary, and Konkani. The content on this platform includes theatre plays, web series, films, short films, and Yakshagana programs. Talkies OTT platform witnessed one lakh plus downloads to date.

### **Conclusion**

Over the Top (OTT) has become a significant player in the film exhibition sector in the country. It has changed the norm of film releases across the significant regional language film industries in India. Its weekly releases, a new content style, local stories, and Talk shows attracted viewers from movie theatres. This study explored how film audiences shifted promptly from theatre to the OTTs to experience the digital content during the pandemic. Although OTT played a crucial role in entertainment during this crisis, many OTT platforms concentrated on regional content. Regional OTTs have created a new model in the film business by providing screening space for small-budget films and localized content.

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# Potential Return Profile of a Multi-Asset Exchange Traded Fund in Indian Context

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## **Abstract**

*Exchange Traded Funds (ETFs) are an innovation in traditional mutual funds and they represent a basket of securities that are traded on an exchange. ETFs aim to closely replicate the performance and risk of the underlying broad, sector specific, fixed income or commodity indexes. As of last review, there exist 122 ETFs on the NSE in India and all existing ETFs either have an Index or the price of a commodity as the underlying asset. Multi-asset ETFs, which are available for investors in developed markets, are largely missing in Indian context.*

*This paper uses the Sharpe ratio and attempts to examine the performance of a Multi-Asset ETF created out of Equity and Debt components in the Indian context. The findings suggest that for the period of study considered, the performance of an ETF created out of NIFTY 50 and a tax-free Bond such as the one from National Highways Authority of India (NHAI) would have been suboptimal with near zero Sharpe ratio.*

*This study will help create a possible model for developing such ETFs in India. Availability of such ETFs would increase the number of choices available to individual investors and aid personal investments with quantified and controlled risk.*

## **Keywords**

Exchange Traded Funds, Sharpe Ratio, Multi-Asset, Individual Investor.

## **1 Introduction**

Exchange Traded Funds, called ETFs in shortened notation and used as such hereinafter, are a relatively new class of investment instruments that have been created to facilitate passive investment at a low cost. An ETF usually represents an Index in the market or the price of a physical commodity or a basket of securities that are traded on an exchange. This allows an investor to participate in the market with relatively modest amounts of capital and, in well developed markets, provides liquidity for investors. An example of an ETF in the Indian context is the NIFTYBeES which represents the NIFTY 50 Index of the National Stock Exchange. An investor can invest in a basket of all the stocks in the 50 stock NIFTY Index with a capital as small as INR 187 as of 30 September 2022 using one unit of this ETF. Prior to the introduction of ETFs, an investor wishing to invest in a basket of stocks represented by the NIFTY 50 would have had to buy 1 share of each of the 50 stocks or would have had to put up margin money for at least one Futures Contract or the premium for an Options Contract.

This would not only have entailed requirement of significantly larger capital, but would have had the attendant risks of derivative contracts such as loss of Time Value and Volatility related risks.

As of last review, there were 122 ETFs listed on the National Stock Exchange of India, these either represent the value of an underlying Index (such as the NIFTY 50), the price of an underlying Debt Instrument (such as the NIFTY 1 Day Rate) or the price of a physical commodity (the price of Gold or a similar commodity). It is difficult to locate and invest in any ETF that represents a combination of chosen equity stocks and a commodity or a combination of chosen equity stocks and a debt instrument. It is indeed hard to locate even a single ETF that has as underlying the combination of multiple underlying assets drawn from different classes of investment instruments.

This article attempts to investigate the return profile of an ETF that combines as underlying an Equity Instrument represented by the NIFTY Index and a Debt Instrument taken as a tax-free infrastructure bond with a fixed coupon rate.

## 2 Theoretical Framework and Literature Survey

ETFs are a relatively new instrument in the Indian securities market, the first one being NIFTY BeES launched in 2001; it is only in the last decade or so that the use of ETFs has gained momentum in the country, primarily through the actions of mutual fund houses and Government regulations encouraging their use.

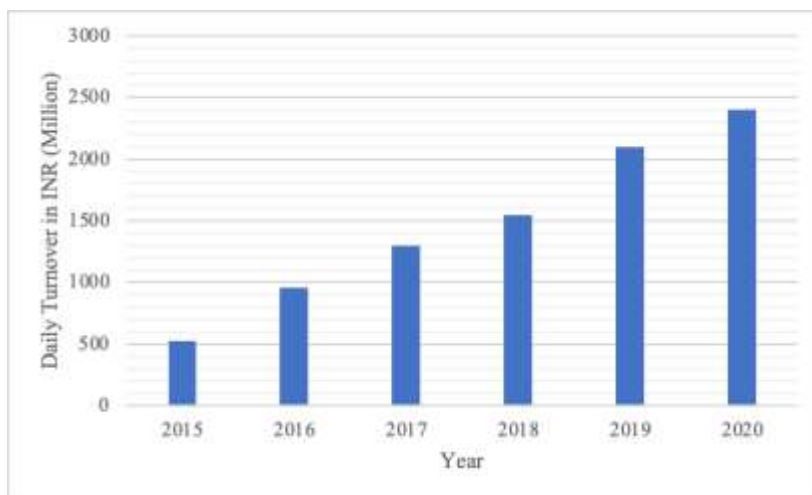


Fig 1: Growth of amount of ETF Transactions in India (in INR Million),

Source: Compiled from NSE Sources

The main drivers of their use, as already noted, are the actions of Market Makers and of the Government and the factors encouraging their use are essentially lower transaction costs as well as transparency in their holdings. Despite these factors, however, in India only Institutional Investors are currently making most use of these instruments with nearly 95

percent of the assets coming from them and a small fraction from Individuals as of mid-June 2019. (Dhabolkar, 2020)

In the subsection 2.1 a discussion on the creation of ETFs. Reddy and Dhabolkar (Reddy Y.V. and Dhabolkar P, 2020) discuss the creation of ETFs by Market Makers. This section allows the reader to understand succinctly, the nuances associated with establishing the NAV of ETFs.

In Subsection 2.2 the Markowitz model for optimum portfolio returns and its use within the computation of the NAV of a mixed asset ETF is presented. Witt and Dobbins have studied Markowitz's seminal work (Witt & Dobbins, 1979) and this is used to understand the formulation of Markowitz's theory.

Subsection 2.3 discusses the Sharpe Ratio and its use in computation of risk adjusted returns; the original work of Sharpe has been revisited by many scholars and this article presents both the original formulation and a slightly modified one.

## 2.1 Overview of Working of an ETF

ETFs work through a creation and redemption mechanism that allows ETF companies to keep the performance of their ETF instruments in line with the price of underlying assets.

When an ETF company wants to create new "shares" of its ETF instrument, it approaches an Authorized Participant (referred to as AP hereinafter). The AP is usually a large institution with a lot of buying power, like a large Financial Institution, a specialist organization or a similar Market Maker. The AP then acquires the shares or bonds or whichever underlying asset the ETF is based on in a quantity needed for creating ETF units. If, for example, the ETF is based on the NIFTY 50 the AP acquires the constituent shares of this index in exactly the same quantity needed for creation of units. The ETF company then gains control over those underlying assets and transfers an equivalent value of ETFs to the AP. The valuation of ETFs for this transfer is made at the Net Asset Value of the ETF units and not on the market price. The number of units in which each tranche of ETFs is created is called the Creation Unit size and is referred to in this article variously as CU or CU Size. Thus, the creation of ETF units creates a demand in the market for the underlying asset and a redemption of units works similarly but in a reverse way.

ETFs are traded on an Exchange like ordinary Stocks and the level of Demand and Supply causes the market price of the price of the units to go up or down. When demand is high the price of the ETF unit tends to increase above the value of the underlying and the Market Maker intervenes buying up quantities of the underlying and selling overpriced ETF units, the price of underlying assets goes up due to this and that of ETF units goes down. This nullifies arbitrage opportunities in the market and the price of ETFs tends to be in line with the value of underlying assets. A reduction in demand of units works in analogous fashion, with the Market Maker buying relatively undervalued units and selling underlying assets; this causes the market price of ETFs to rise, the prices of underlying assets to fall and the market price of ETF units tends to be at par with the Net Asset Value (NAV) of underlying assets. An overview of the working of ETFs is also provided by Blakey. (Blakey, 2007)

### 2.1.1 Net Asset Value (NAV) and Market Price

The preceding section has already explained how the market price of ETF units tends to track the value of underlying assets. Many studies have been conducted to find the degree of tracking error between the market price and the NAV. Even in the Indian context, where the volume of transactions in ETFs is relatively low, scholars like Reddy and Dhabolkar have found that the NAV tracks the market price very closely.(Dhabolkar, 2020). Studies in other developing economies are also indicative of this phenomenon. Lin et al. (Lin & Chan, 2005) have studied the price behaviour of ETFs in Taiwan and they concur with Reddy and Dhabolkar about the way NAVs track the market price. A discussion on price behaviour of ETFs in Turkey by Kayali (Kayali, 2007) also concludes on similar lines. These studies confirm that differences in price and the NAV of ETFs reduce to insignificant amounts with a lag of a maximum of 2 days.

For practical purposes therefore, for this article, the NAV of an ETF has been taken as indicative of the market price of an ETF and vice versa.

### 2.2 The Markowitz Model

Harry Markowitz provided pioneering contribution to Portfolio Theory in 1952 with his Mean-Variance Formulation that quantitatively describes the effects of diversification within a portfolio of assets. This initial work has been subsequently worked upon by many economists and experts and an excellent can be the article by Witt and Dobbins where they explain the workings of Markowitz's theory. (Witt & Dobbins, 1979).

The authors not only provide an explanation of this theory, but also explain the mathematical workings which underpin this work. An attempt has been made in this study to explain in brief how the Mean-Variance formulation works. The use of Markowitz's model in NAV computation has also been explained in a subsequent section.

Investors have been intuitively aware about the benefits of diversification within a portfolio of assets long before Markowitz's pioneering work. The Mean-Variance formulation provides a quantitative analysis of these benefits. A few of the underlying assumptions for this formulation are mentioned below:

- 1) Investors perceive a range of returns from their portfolio; these returns comprise of individual returns from component assets of the portfolio.
- 2) Investors perception of risk is proportional to the variability of returns from an asset within a portfolio or the entire portfolio itself.
- 3) Investors can make investment decisions based on 2 parameters, namely the return from the portfolio and the variability of returns, which they perceive as risk.
- 4) Investors are risk averse; an investor would prefer to take the minimum risk possible for a given return. The converse is also true, for a given level of risk, investors wish for the maximum possible return.



The expected return of a portfolio made up of k assets is simply the weighted average of the return from each individual security making up the portfolio:

$$E(R_p) = \sum_{i=1}^k p_i R_i$$

The risk perceived by investors can be modelled by the variance of return of each security along with the covariance of returns between each pair of securities:

$$V(R_p) = \sum_{i=1}^k (p_i \sigma_i)^2 + 2 \sum_{i=1}^{k-1} \sum_{j=i+1}^k p_i p_j \rho_{ij} \sigma_i \sigma_j$$

Where  $E(R_p)$  is the expected return on the portfolio and  $V(R_p)$  is the variance of returns.  $p_i$  is the proportion of the  $i^{th}$  asset in the portfolio  $\rho_{ij}$  is the coefficient of correlation between the  $i^{th}$  and  $j^{th}$  assets and the  $\sigma_i$  term refers to the standard deviation of the  $i^{th}$  asset and so on.

A portfolio comprising the two underlying assets was created in our case and the price of the ETF so constructed was computed; the equations above get simplified for the two-asset case to:

$$E(R_p) = p_1 R_1 + p_2 R_2$$

where  $E(R_p)$  is the expected return from the portfolio;  $p$  refers to the proportion of an asset and  $R$  is the return from an asset

This extremely simple equation is used for computation of NAV of our ETF comprising two underlying assets.

### 2.3 The Sharpe Ratio

The Sharpe Ratio was created in the late 20th century by William Sharpe, an American economist, to measure the risk adjusted return on different asset portfolios. This ratio measures the returns of a given asset portfolio over the returns from a risk-free asset, adjusted for the risk inherent in the investment. (Vinod & Morey, 2005) This can be defined as follows:

$$SR = \frac{(R_p - R_f)}{\sigma_p}$$

Where SR stands for Sharpe Ratio, the numerator is the excess return from the portfolio  $p$  over a suitable risk-free investment, usually a Treasury bond or an equivalent government bond. The risk-free return is shown above as  $R_f$ . In practice, this numerator is an average of excess returns taken over a number of periods. The standard deviation of portfolio returns is the divisor.

Multiple improvements have been suggested over the original Sharpe Ratio by many independent scholars and a useful reference for those interested in different ways of refining

this measure is the discussion by Dowd (Dowd, 2000) where an improvement involving the computation of SR ratio *ex-ante* and *post-facto* is discussed. In this article, a computation is made using both the original definition as well as the improved definition provided in Dowd which is reproduced below:

$$SR_{modified} = \frac{(Rp-Rf)}{\sigma(Rp-Rf)}$$

Where SR stands for Sharpe Ratio, the numerator is the excess return from the portfolio p over a suitable risk-free investment, usually a Treasury bond or an equivalent government bond. The risk-free return is shown above as Rf. In practice, this numerator is an average of excess returns taken over a number of periods. The denominator is different from that used in the original definition and is the standard deviation of the excess return over the benchmark, risk free asset.

### 3 Methodology used for the Study

This study uses publicly available secondary data to empirically test the return profile of an ETF created by using a combination of an underlying representing the broad equity market, namely the NIFTY 50 Index of the National Stock Exchange of India and a pure debt instrument, in this case the NHAI NA Series bond of the National Highway Authority of India. The broad steps used for this study, explained in brief, are as follows:

- 1) Obtain relevant data from the National Stock Exchange of India and the Reserve Bank of India on the price of the underlying assets and the risk-free rate of return.
- 2) A conceptual ETF is created using the NIFTY 50 Index values and the NHAI bond's values. We have used the approach laid down in the ETF Handbook authored by Abner ("ETF Valuation," 2016). This is explained in brief within the Analysis section.
- 3) A portfolio comprising the two underlying assets was created and the price of the ETF so constructed was computed; we have used the NAV as the price of the ETF. We have made use of Markowitz's approach for estimation of returns from the portfolio.
- 4) Finally, the Sharpe Ratio was computed in order to estimate the risk adjusted returns of the abovementioned portfolio.
- 5) A comparison is carried out to allow for interpretations and conclusions.

### 4 Data

Data for the study has been obtained from the National Stock Exchange of India mentioned as NSE for short in this article. Data used comprises the spot value of the NIFTY 50 Index published daily by the NSE and available for download at:

[https://www1.nseindia.com/products/content/equities/indices/historical\\_index\\_data.htm](https://www1.nseindia.com/products/content/equities/indices/historical_index_data.htm)

Data on the daily performance of NHAI bonds was also obtained from NSE sources available at: <https://www.nseindia.com/get-quotes/bonds?symbol=NHAI>. Data on bond yield of 1 year Government Bonds is available at the Reserve Bank of India website and is also available on popular web based data providers' sites such as [www.investing.com](http://www.investing.com) that can be accessed at <https://in.investing.com/rates-bonds/india-1-year-bond-yield-historical-data>

These were chosen due to practical issues of access to data and the amount of data chosen, given the relatively low trading volume of bonds and the cost of acquiring data from authoritative sources in India. On the equity index side, the NIFTY 50 was chosen as it is one of the most commonly used indices in India and it represents the broad equity market in the country.

## 5 Analysis and Interpretation

A conceptual ETF is created using the NHAI bond and the NIFTY 50 Index. The price of this ETF is taken as the NAV as already mentioned and the approach outlined in the ETF Handbook by Abner is used for computation of the NAV, thus:

Scenario: An ETF is created with equal proportion of investment in the NIFTY 50 index and NHAI bonds, this scenario can be easily changed by changing the number of units of the underlying constituents in the ETF.

In this scenario, going by the approach above, the values of certain parameters related to ETFs need to be either known or assumed. The most important ones are:

- 1) Creation Unit size – CU: is taken as 50000 for this article's purpose
- 2) Number of Units outstanding – N: this is kept as 1 CU size or 50000 as in this case a new ETF is being created and only 1 CU is being initially created to start with.
  - a. This number will keep changing, initially increasing as new units are created and sold and then progressively going up or down based on new ETFs being created or redeemed.
  - b. When new units are created, they increase in multiples of the creation unit size or CU
  - c. Redemption of units by unit holders could be of any magnitude and does not have relationship with the creation unit size CU.
- 3) Total Cash – TC: The starting value of this is the uninvested cash amount left over after creation of 1 CU Size of the ETF. Total cash will increase as time goes by because the bond component of the ETF will pay interest at a predefined coupon rate.
- 4) The NAV can be calculated using the following expression:

$$NAV = [(\eta_1 P_1 + \eta_2 P_2) + TC] / CU$$

Where  $\eta_1$  refers to the number of units of asset 1 and  $P_1$  to the current price of asset 1 in the ETF, TC is total cash and CU is the creation unit size.

This is in line with the Markowitz approach, although it is not exactly the same and is an approximate expression under assumptions of starting a new ETF with a fixed CU size, without any other liabilities.

A portion of the table of values is reproduced below relating to the NIFTY 50 index and the NHAI bond price with the parameters chosen above: CU size of 50,000, initial capital available of INR 200 Million and approximately the same value of investment in the debt and the equity components. The resulting NAV using the equation above is also presented. It is noteworthy to observe that the Total Cash increases slightly over time as no new units of ETF are created.

Table 1: NIFTY and NHAI bond values with NAV computation

<b>Date</b>	<b>Total Equity Value (INR)</b>	<b>Total Bond Value (INR)</b>	<b>Total Cash (INR)</b>	<b>NAV (INR)</b>
30-Sep-22	5,34,19,843	5,50,13,437	8,95,86,134	3,960.39
23-Sep-22	5,41,47,968	5,49,84,375	8,95,86,134	3,974.37
16-Sep-22	5,47,83,906	5,52,14,531	8,95,86,134	3,991.69
09-Sep-22	5,57,29,218	5,53,54,218	8,95,86,134	4,103.39
08-Oct-21	5,59,22,500	5,83,40,625	8,95,86,134.	4076.99
01-Oct-21	5,47,87,656	5,82,05,625	8,95,27,573	4,050.42

All values are in Indian Rupees designated as INR

The entire table has not been shown, only chosen few rows are shown; the grey row shows break in tabulated rows

The computation follows a simple mechanism of using very recent data of the last 1 year, from data sources mentioned prior, to compute the size of equity and debt under the scenario assumption of roughly equal investment in the bond and equity components. This computation is dependent on the CU size (chosen as 50,000) and indeed the amount of capital available for deployment. The value of interest that accrues due to the bond component of the ETF contributes to increasing the Total Cash and in turn increases the NAV. In this case the coupon is fixed at 7.6% annually for the bond and a simplifying assumption of linear accrual over the year is made, using a 365 day year.

Once the NAV has been computed, these values are used to find the weekly returns from the ETF as a change in the NAV upon the period beginning NAV; each individual weekly return is expected to be moderate while the effects over longer periods may be considerable. On running the computations it is observed that the returns from either the Index through the period under consideration or the bond for the same period is very low. The summary findings are tabulated in Table 2 below.

Table 2: Computed Values of Sharpe Ratio and Modified Sharpe Ratio

Measure	Reference	Weekly % Return	Value
Average Rp	a	-0.04133	
Average Rf	b	0.03117	
Average (Rp-Rf)	c	-0.07251	
Std. Deviation Rp	d	0.74496	
Std. Deviation (Rp-Rf)	e	0.74481	
Sharpe Ratio	c/d	-	-0.09733
Modified Sharpe Ratio	c/e	-	-0.09735

The computations of (Rp-Rf) and the variance for the return or the variance for the difference (Rp – Rf) are both found to be close to each other, but significantly higher than the average of the excess return over the risk free asset (Rp-Rf). This indicates that the Sharpe ratios being investigated are very low and leads to conclusions that are presented in the next section.

## 6 Conclusions

As a thumb rule Sharpe ratios of less than 1 are considered suboptimal, ratio values of 1 are considered acceptable, values of 2 or slightly higher are considered good and values greater than 3 are considered excellent. There are studies on the interpretation of Sharpe ratios when the excess return is negative, as in the case of this study. McLeod and van Vuuren (McLeod & van Vuuren, 2004) discuss two cases of negative excess returns and the way to interpret Sharpe ratios.

The computed Sharpe Ratio for the scenario presented in this study, whether based on the original definition or the modified one, is very low and is also negative, it is prudent to conclude that an ETF built on NIFTY and a fixed coupon, tax free debt bond would not appeal to any discerning investor. Market Makers too, consequently, will not be interested in creating such an instrument in the prevailing interest rate and inflation regime.

The observed empirical result seems to suggest that in an environment of rising interest rates, which is indicated by the risk-free rate continually rising throughout the period under consideration, it may be prudent to invest in safe instruments where principal is protected and a fixed income based on a fixed coupon is available.

## 7 Suggestions for Improvement and Further Investigation

The study could be improved by using a combination of different assets as the underlying for the ETF created. Multiple scenarios with different proportions of each asset could also have been tested. This might lead to the possibility of discovering optimum combinations of underlying assets.

A slightly different line of investigation presents itself wherein a study can be designed to understand the effects of market maturity on the tracking error between the NAV of ETFs and their market price. As an allied exercise, a review of mutual funds that are based on ETFs in developed markets and the possibility of recreating similar funds in the Indian context could also be undertaken.

It may be instructive for scholars in this domain to include Crypto assets within the ambit of analysis. These assets typically have high returns coupled with high to very high variability, which makes investors find them extremely risky. Inclusion of such assets may provide insights into possible portfolios of the future. This endeavour might need the creation of a different statistic for measurement as Crypto assets and traditional ones behave very differently.

## 8 Limitations of this Study

This study and the Sharpe Ratio have inherent shortcomings which are to do with the following:

- 1) The Sharpe Ratio is very sensitive to the standard deviation of the returns from the portfolio, in cases where the variability of returns is very low, the Sharpe ratio can mislead investors into choosing investment portfolios that have lower than optimum returns.
- 2) The Sharpe ratio also varies with the time horizon chosen for a study; it may be prudent to compare ratios of different portfolios using similar time frames for analysis.
- 3) This study uses only a single scenario and only one combination of an Equity and a Debt instrument.
- 4) The Risk-Free return data has been sourced from Investing.com website, which is a very popular site but cannot be considered as an official source of data. The value of the risk-free rate, unlike the prices of stocks and bonds, does not change from minute to minute and it has been therefore considered accurate enough for purposes of computation to use these values.
- 5) This study uses only 1 year's data; a better possibility is the use of around 5 years data with the returns averaged over a monthly time frame. Larger time frames typically have larger standard deviations, however the interest regime over longer time periods may be different leading to a more balanced view being formed.

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# Is Digital Currency a Payment Disruption Mechanism?

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## **1. Abstract**

*Digital economies are omnipresent, evident, and inhabit every sphere of human existence. Blockchain technology has changed how private currencies such as bitcoin and Ethereum are traded in open markets. To strengthen and protect the economic & financial system against such private currencies, the central banks around the world have leaped to introduce their own Central Bank Digital Currency (CBDC) for phasing out with high technology transformations. The present paper will be a first of its kind attempt to capture the perceptions and real-time issues of common people in the implementation of CBDC in a large country like India. As CBDC is still in its pilot phase of implementation, researchers have used the bottom-up approach to capture the requisite information from the common man view and the thematic analysis method was used to finalize the variables viz., financial literacy & inclusion, infrastructure, technical know-how, trust & belief in the system, and acceptance level for further discussion. The result analysis highlights, that government and implementing agencies of CBDC should ensure to reach the unreached population, especially in Tier-2 & 3 cities with proper technology infrastructure, and frequently hold awareness/orientation campaigns to realize the benefits of financial inclusion and easy adaptation of digital currency.*

## **2. Keywords**

Digital Currency, CBDC, Fiat currency, Blockchain, Financial Inclusion

## **3. Introduction**

Civilization existed even before money, but probably radical economic progress was witnessed through invention and mediations with various forms of money. We have evinced the shift of medium of exchange from barter – coins – paper – cards – now to digital for easing the economic activities. The need for a standardized form of fiat currency with inherent value, dividable, homogeneous, liquid, rare, and stable value (Rose, 2015) had become inevitable to easily connect to the world, by enabling the smooth trade activities and investors to mass wealth creation. Even though fiat currency was very promising in all its existence, has a detriment position in illegal forms such as money laundering, tax evasion, financial fraud, bribery, white-collar crime, misappropriation, insurance and identity fraud, and so on. With the rise of fintech, net banking and online transfer of money have drastically changed the entire payment system with a high assurance of accountability and transparency.

India being a promising emerging market has grown remarkably in terms of trade and business



activities. The country also has ventured into a huge space of fintech with a robust financial system in place. Though we have a traditional mode of payment systems such as cheques, withdrawals, drafts, money orders, letters of credit, gift cards, etc., this still did not seem to solve the problem of money transfer within the stipulated time and safety. As such, various modes of payments such as NEFT, internet banking, and electronic fund transfers became prominent, especially in pandemics. The extension of the mobile banking system gave tremendous acceptance of Unified Payment Systems (UPI), e-wallets such as Google Pay, Phone Pe, Paytm, etc. In addition, demonetization was one such event that disrupted regular payments and gave an acceleration for usage and extension of e-wallets. Around 93 percent of urban Indians have extensively used digital wallets both in-store and online, which is way ahead of 55 percent of the global average. Such a promising system has its own impediments in terms of infrastructure, financial literacy, trust and safety, and technology know-how, especially for the marginalized section of society.

Blockchain technology in private currencies such as bitcoin, Ethereum, stable coins, etc., have interrupted the strong existing financial system, and as a mandate, the central bank is exploring Central Banking Digital Currency (CBDC) as their form of electronic currency to stabilize the economic progression and reduce the usage of private currencies. Electronic currency sponsored and issued by the RBI is Central Bank Digital Currency (CBDC). As per Atlantic Council CBDC Tracker report, around eighty-seven countries (with a representation of over 90 percent of worldwide GDP) are in the pursuit of researching on CBDC as a full-fledge currency in the pilot program. In May 2020, around 35 countries are in the research phase, and 9 countries have already launched a digital currency of their own. Bahamas has launched its CBDC 'Sand Dollar' in 2020, Nigeria with 'e-Naira' in 2021, and countries such as China is in pipeline to launch their own CBDC in the winter Olympics.

In India, the Reserve Bank of India (RBI) seeks to begin a payment ecosystem that gives the go ahead for a safe, swift, and low-cost, economical and cost-effective digital payments to every individual across the length and breadth of the country. The pilot launch of India's CBDC is awaited in the first quarter of 2022. In this paper, we have attempted to capture the transformational phase of fiat currency to digital currency in India. The core objective of our paper was to assess the level of awareness and acceptance of CBDC among the various community. Also, identify the issues and challenges to be addressed by the Government and policymakers while implementing such a technology-oriented system in a democratic country like India. This paper will be the first of its kind, as we investigated the entire transformation process through the lens of a bottom-up approach to geographical locations.

#### **4. Review of Literature**

Money is defined as an arrangement within a society, to use some material as a means of exchange, which plays an effective and efficient role that meets its requirements that can be accepted through the valid currency law (Yuneline, 2019). Digital payment has been defined in various literature as a platform that is used for making monetary transactions and its importance grows as this has become a great facilitator of e-commerce (Malusare Lalita Babulal, 2019), (Sahi et al., 2021). India is still a developing country; in maximum rural areas, the literacy of technology is still only 6.5%. There seems to be tremendous growth, however, proper financial literacy is still required (Borkar, Avinash Galande, 2020). Financial literacy is the key to the growth and transformation of India

into a cashless economy (Baghla, 2018). (Babulal, 2019) states the advantages of digital payments were found to be a time-saver, better accessibility, easy purchasing, etc. Few of the most frequent electronic payment systems in India includes Debit Cards, Credit Cards, but the use of Electronic Fund Transfers, Net Banking, Unified Payment Systems (UPI), e-commerce

payment systems, internet banking where Paytm, Phone Pe, Jio Money, BHIM, Google pay which has been concluded in various pieces of literature as a part of the adoption of digital payments by (Bagola, 2018),(Byakod et al., n.d.),(Ghosh, 2021), (Shailza & Sarkar, 2019). The better part is that even the lower income group of people are also moving towards digital (Bijapurkar et al., 2020) in rural Karnataka as well (Byakod et al., n.d.). The awareness, purpose of usage, and factors influencing the preference for digital payment systems in Coimbatore City are explained by (Krishnakumari & Pavithra, 2018). Similar variables perception of cash vs digital payments, online fraud experience, and trust are explained by (Shree et al., 2021) to verify the acceptance of such digital currency.

Blockchain is a decentralized, digitized, public ledger of all cryptocurrencies (Kaur, 2020). Bitcoin, one of the most popular examples of cryptocurrency is defined as a peer-to-peer network by (Chris Rose, 2015). CBDCs would also potentially enable more real-time and cost-effective globalization of payment systems (Central Bank Digital Currency – Is This the Future of Money). As per the Fintech in India report on Powering Mobile Payments (2019) in the year 2016-17, there were around 1.5 million acceptable locations, and local merchants accepting digital payment has increased to 10 million within 2 -3 years (Borkar, Avinash Galande, 2020).

In July, the Monetary Authority of Singapore in collaboration with JP Morgan Chase and Temasek said that they "successfully" settled payments in various currencies on the blockchain based network. The bank's managing director has mentioned that he would be welcome the collaboration with China. The Bahamas started its "project sand dollar" pilot in its Exuma district on Dec. 27, 2019. The trial consisted of more than 1,000 respondents a month, and the nation plans to extend their program across all 700 of its islands before year's end. In 2018, Venezuela launched the petro, a cryptocurrency (allegedly backed by oil reserves) designated to provide help to citizens to cope with international sanctions and the dysfunctional nation's hyperinflation. The petro has been a flop, and the U.S. is offering a \$5 million bounty for information leading to the capture of the initiative's leader, who has been indicted for drug trafficking and sanctions violations (HACKETT, 2020). For achieving the potential benefits of CBDC for public welfare while preserving financial stability along with public-private sector cooperation, there is a need for further exploration of CBDC design choices (Auer, et al., 2021) and its micro to macro financial implications on a different segment of the population need to consider. The present paper explores the real-time perception and observation of the common man for the digital transformation of the new form of the currency system. The researcher has adopted the bottom-up approach to providing the dimension of various segments of the population with different age brackets, geographical regions, occupations, and levels of literacy.

## **5. Methodology and Sampling**

The qualitative method opted for such study to understand the pulse of initiation of Indian CBDC version in near future, various stakeholder was involved from across the nation to collate the perspectives and their know how on digital currency era. Focus Group Discussion (FGD) survey method was used to collect requisite information as the topic of research was still niche.

Through this focus group, we have attempted to understand the perceptions, awareness, opinions, and ideology about Central Banking Digital Currency and their views on implementation. Attempted to identify the issues and challenges to be addressed by the Government and policymakers while implementing such a high technology-oriented system in a democratic country like India.

We clustered the entire population based on Tier-1, Tier-2, and Tier-3 cities covering both urban and rural populations. We covered 6 states with two districts (high privilege and under privilege districts) and further two villages/towns under each district. Table.1 shows the sample selection based on the geographical location of the participants. Further, moderators have adhered to gender balance in every survey, so totally we had 153 females, 276 males, and 8 transgenders participating in this survey. Because of the Covid situation, data were collected both in-person and online (through Google meet) for professional and educated classes.

A semi-structured questionnaire was designed to capture the required dataset and enough illustrations were done to demonstrate the process of implementation of CBDC in other countries and its learning for India. In addition, data were also captured to check their awareness of blockchain technology and the technical know-how of various operations.

Table.1 shows the sample selection based on the geographical location of respondents:

State	District	Village/Town
Karnataka	Bengaluru	Dasanapura
		Kadigenahalli
	Hubli-Dharwad	Agadi
		Umachigi
Andhra Pradesh	Hyderabad	Saidabad
		Golconda
	Kurnool	Ulchala
		Konidela
Maharashtra	Sangali	Haroli
		Kadamwadi
	Mumbai	Tirandaj
		Aare
Gujarat	Ahmedabad	Detroj
		Dholka
	Jamnagar	Fala
		Nani Matli
Himachal Pradesh	Kullu	Manikam
		Kais
	Bilaspur	Bagi
		Jamthal

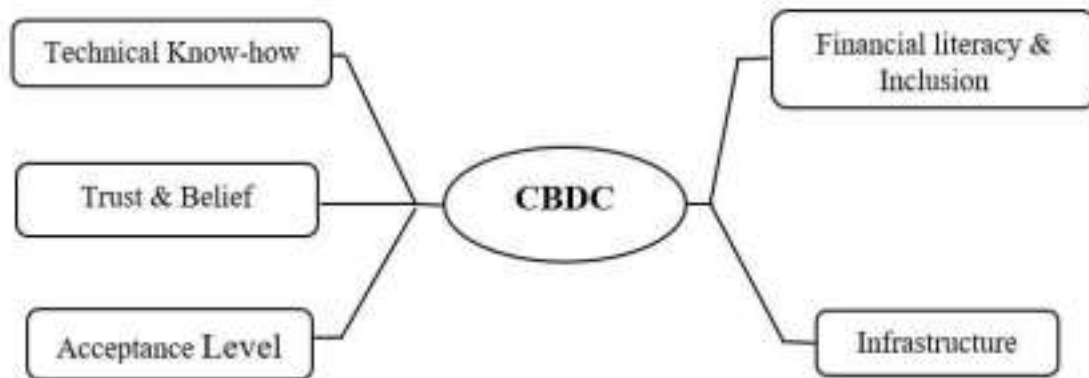
Street Vendors
Petty Shops
House Maids
Students
Housewife
Unemployed
Corporate Workers
Civil Servants
Retired Officers
Teachers/Professors
Drivers
MSMEs
Entrepreneurs
NRIs

(Source: Authors<sup>7</sup>)

Apart from the above sample respondents we also have inputs polled from places such as Bareilly, Vizag, Madurai, Kota, and Kolkata. Each group size for FGD varied between 5-6 members based on their consent for the interview and availability of time. Each FGD lasted for 15- 20 minutes with a focus on capturing the level of awareness and acceptance new form of digital currency and the momentum of the Indian CBDC version. As the concept of CBDC is still novel, enough training and orientation were done to moderators and timely assistance

was given by the researchers. Data were collected between November 2021 to February 2022. We have ensured to take the ethical consent (verbal) in their regional language from each participant in every scheduled interview, explain the procedure of information gathered, confidentiality and privacy of data collected. Also, prior permission was taken to audio record all the survey responses from each group. As the respondents belong to various communities and states, questions were administered in their regional language, and responses were entered in English.

We have used the thematic analysis method for analyzing the data collected. An inductive approach was followed for arriving at the theoretical framework to assess the level of awareness and acceptance of CBDC from selected respondents. Data both transcript and audio were intensely observed for familiarization of data collected and initial codes were developed on contents captured. Later, we moved into identifying the themes which access the objectives of the present study, and a rigorous review process was undertaken for the finalization of the themes. Five board themes viz., financial literacy & inclusion, infrastructure, technical knowhow, trust & belief in the system, and acceptance level were confirmed.



(Source: Authors')

After a defined discussion process, analysis was done based on the above-finalized themes. The themes address the awareness, acceptance, and foreseen real time-tested challenges for the implementation of such a massive technology-based system where the majority population is living in rural or semi-urban; uneducated and illiterate; with poor economic backgrounds.

However, the present study has not investigated the technical implementation process whether it's a blockchain technology or UPI-based. Distribution mechanism systems i.e., retail or wholesale or token-based CBDC, and tax-related infrastructure were not a part of the present study. We also observe that around 52 percent of the working-class population in metropolitan or cosmopolitan cities are people who have moved from smaller villages to tier 1 cities, where most of them have closely adopted or learned to adapt to the existing technology.

## 6. Results and Discussion

Based on the data captured through FGD and confirmed themes further results and discussion were derived.

## 6.1 Financial Literacy & Inclusion

India's economic growth rate was 8% in the year 2014–2015 and although is one of the fastest growing economies in the world, still financial literacy is low compared to other countries. Financial Literacy is defined as the capability to analyze, manage, and learn to earn or invest money (Lokesh Vijayvargy and Priti Bakhshi, 2018). It is considered one of the most important factors today for promoting financial inclusion, consumer protection, and lastly financial stability. Financial Inclusion on the other hand ensures necessary access to financial products and services in all sections of the society fairly and transparently are delivered. Financial literacy and inclusion need to go hand in hand to enable the common man to understand the needs and benefits of the products and services offered by formal financial institutions.

Financial literacy and inclusion are a global concern mainly in under-developed and developing economies, such as India. When it comes to making financial decisions, the common man understands the needs and benefits of the products and services offered by formal financial institutions. So, from the financial literacy perspective, it essentially involves two elements, one of access, and the other of literacy through which financial literacy and inclusion play a major factor (Lokesh Vijayvargy and Priti Bakhshi, 2018). It could be even more impactful if, its concepts have been taught in the curriculum in schools at an early stage and make personal finance part of basic education (Sharon Taylor & Suzanne Wagland, 2013).

In the present study, there were quite a lot of comments we received from our Focus Group Discussions (FGD). We had a few graduate students mention, "The place (Bareilly and Golconda) 70-80% people will not be able to handle the shift to CBDC. The reason is they are not well educated. Literacy is not up to the mark, most of the elderly population still unable recognize the fiat currency notes, they try to identify through color combination or size of the paper currency!"

The lack of financial inclusion has also been mentioned by our respondents stating, "Even though it is made mandatory that the labour side have bank accounts, but even now if they have any problems they don't even know how to go to banks and sort it out. So, asking them to use the digital they would not prefer it. It won't penetrate to the lower level in most cases. Every implementation that happens it has reached the tier 1 cities and partial in tier 2."

"Basically, from the business point of view – I don't think this will work (Tirupur and Fala) because most businesses don't pay taxes and come under the bracket of unorganized. And, they think it is a real-time challenge to provide financial literacy because the population is so large." There were a few who did not prefer the shift for the very reason of financial literacy and inclusion, "We are not sure what impact the e-currency would have. What will the people in rural side do where people cannot learn even if we give literacy?" shows the non-acceptance of the new currency system.

From the above analysis of literature and focus group discussions with our respondents, we understand that financial literacy and inclusion go hand in hand. As much as literacy is important, we see that inclusion is also lacking in a lot of tier 2 and tier 3 cities and other districts in India.

From our study, we believe, both the factors are the two sides of the same coin which becomes a key factor in our research.

## 6.2 Infrastructure

Financial infrastructure and intermediaries play a 'central role' in the financial market by Director, China Central Depository & Clearing Co., Ltd (CCDC), China. (Yi, 2020). Every complex system requires an appropriate infrastructure with clarity as clear as crystal along with the resources, framework, power grid, required energy consumption, hardware, and software implementation, and much more to support an e-currency for an entire nation with a huge population as India.

Financial infrastructure and inclusion are defined as "the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost" (Taufeeque A. Siddiqui, Kashif I. Siddiqui, 2020) which closely relates to understanding the importance of financial structure in the economic system in India.

An analysis of the recent trends in the expansion of financial infrastructure states that it is now well recognized that the banking system of a country is in its financial infrastructure and balanced development and availability of banking facilities in a country is crucial to its rapid, balanced, and inclusive economic development (Dr. Sukanya, 2016). Literature "stresses the role of financial institutions in the efficient allocation of financial resources required for the full use of resources for capital formation.

It has been highlighted that the role of financial development in promoting the efficient investment of financial resources in a country, crucial for its rapid economic growth. It also highlights the role of financial institutions in financing entrepreneurs engaged in technological innovations, a theme developed originally in 1949. From the above, we tend to understand that efficiently to help improve the financial infrastructure of any country we need to further focus on a centralized banking system in the country.

As a step toward digital currency in India, the government of India has launched an electronic voucher-based digital platform system called "e-RUPI" which is a person-specific and purpose specific payment system. The launch and implementation of e-RUPI will be one of the most convenient methods for a cashless economy. This will be a prepaid gift voucher that can be redeemed at specific centres without any credit or debit card, a mobile app, or internet banking. The issuing entities will be onboarded by banks on its UPI platform. There seems to be a lot more positive impact and acceptance when the digital currency is launched via the UPI system rather than the mining of cryptocurrency. It would be most advisable to accept the approach via the UPI system. Alternatively, earlier studies state that a cashless and contactless digital payments system that could be delivered to mobile phones of beneficiaries in form of an SMS string or a QR Code could be more efficient and an easier way to adapt to the shift in terms of acceptance and implementation. Now, as it is still in the initial stages, it is quite unsure which technology is going to be implemented.

During a further discussion with respondents, a few pointers were raised related to the existing

financial infrastructure available in the country, the infrastructure required for the implementation of CBDC, and the reach in the country to every individual making it accessible and efficient. A group from Andhra Pradesh states "As the government is still not able to provide electricity to reach all houses. They still feel it should be 70-30 with 30% cash. If the infrastructure is in place, we could go 100%. For example, if I'm hungry and I don't have a battery on my phone I won't be able to eat. Maybe a card system where we can directly access it". One of our respondents from Thrissur, Kerala district stated that "Even though it is made mandatory that the labor side have bank accounts, but even now if they have any problems they don't even know how to go to banks and sort it out. So, asking them to use the digital they would not prefer it. It won't penetrate to the lower level in most cases. Every implementation that happens has reached the tier 1 cities and partial in tier 2. We would like to shift but we don't see it practically possible". People still prefer hard cash as stated, "I would prefer mostly hard cash as well. It is because it is technology-based and we will have to depend on technology". There were a few questions that we came across, "In Kulu, some of the mountain regions – some people don't even have a smartphone or a connection. They don't have resources, what will they know about e-currency?"

People have also faced personal experiences of infrastructural technicalities stating, "I don't want to take anything new. The reason being – from my experience (like Paytm) I try to use it, but some issues – no network as such. Unless I have cash in hand, I don't want to do any purchase." People also believe that if digital currencies are implemented the cost for a common person would rise as they mention, "We will require resources such as internet, smartphones all the time which is now an expense to continue paying for connectivity. Digital technology is not completely reliable – we are not sure when it could collapse in terms of servers, etc. We should not panic in such cases." From our FGD, we understand that people are still very skeptical about the existing resources available for the usage of e-currencies and digital payments. There are a huge labor class people in India who till the present day survive on hard cash. As this group of people still rely on cash, it is evident that they do not have any knowledge about the technology required for financial stability or usage presently. It seems clear that financial inclusion and providing them with infrastructure would be a challenging task. Providing infrastructure with the required resources in a cost-effective manner is also an important factor to consider. We also understand the law protecting the financial infrastructure needs to be in place. As one of our respondents who are students stated that "We don't yet have a Data protection law in our country and with the recent, IT act they passed, they said they will stop Facebook and implement a hierarchy – they were canceling the encryption – that was so much of data breach."

The educated class who participated in our FGD also stated that the current UPI system serves the purpose of digitization. The reach of infrastructure is very important such that the government needs to ensure that every individual from tier-3, tier-2, tier-1 cities, including districts and other rural places also has access to the required infrastructure.

One of the major concerns that stick in the minds of the educated class of the country is if India is going to be able to afford the cost of a digital currency whilst promoting and working rigorously towards making an impact.

### 6.3 Technical know-how

CBDC will be backed by distributed ledger technology (DLT) but works on permissioned blockchain which will make it different from other permissionless cryptocurrencies (RBI

Speech June 2021). CBDC ecosystem may have a homogenous risk for cyber-attacks as existing payment systems are exposed. As the country faces humongous problems relating to minor financial literacy levels, the increase in digital payments has high threats of fraud and data/transaction hacking issues. Before the implementation, the government should ensure that the people are well prepared and equipped with sufficient technical awareness/orientation interventions at various levels for large acceptance of such massive technology transformation and implementation.

Well-educated respondents have the awareness and acceptance of the digital currency. However, what resists them is the fact that if it will reach the tier 2 and tier 3 cities and people in rural districts such as, "If everyone has to go into the digital method, do the government has the infrastructure to handle the load of transactions? What if the server crashes suddenly? What if someone in the village wants to pay their loan at the last moment (because that's how loans are paid in villages) they try to get their daily wages and try to pay their loans, what if he misses it and interest is charged to him because the servers are down?"

This is further possible upon the evolution of super-fast internet, and telecommunication networks and ensuring the broader reach of sophisticated technology to the general public every corner for smooth transact on CBDC.

#### 6.4 Trust and Belief

Central Bank Digital Currency (CBDC) is foreseen as the game changer to provide a big leap to the digital economy and offer benefits to its users in terms of liquidity, scalability, acceptance, ease of transactions with anonymity, and faster settlement. To ensure such transformation, trust and belief play a very significant role in its acceptance and usage. It should be noted that there are a few elements that revolve around sticking to the system of acceptance to work comprehensive and collaborative for change management. The majority 64 percent of the respondents felt that digital currency mechanisms can pose hurdles such as data privacy, security, and safety of transactions. There is always a high chance of hacking and data leaking recently evidenced in many cases. Even though RBI will issue and monitor the entire process of digital currency and conversion of digital to the physical form of currencies, there is a huge risk involving the trustworthiness of financial intermediaries and channels which supports such a system at large. Respondents from the rural side felt that with the existing system for withdrawing money from post-office / banks or even to open an account normally local broker at the village level charge hefty amount and to withdraw their own money they collect money on every transaction! With this ground reality and no monitoring system in place at ground level, how do you think digital currency systems are more trusted than existing systems? If something happens to our money whom to approach? When we don't have electricity or a smartphone or even reading ability itself, how do you think we can have trust or access to such a system?

These few questions were raised by respondents while interviews.

CBDC can have worries even about central banks losing control over the payment systems. Individuals with a higher level of education or income and status quo especially from Tier-1 cities are most likely to trust and change to any type of payment transaction. They are also open to private agencies managing and controlling the digital currency as most of these segments of the population are already one-way or other exposed to private currency or



transactions. When we looked up to Tier 2 and Tier 3 or even semi-urban to the rural population of Tier -1 places, we barely have awareness or access to such payment systems. The working-class respondent from cosmopolitan or metro cities even though they extensively make use of digital payment mechanisms like Paytm, or phone pay find it very difficult to convince their people to transform fiat to digital mode. They feel very insecure if they don't have hard cash in form of paper or coins. It's a great challenge to convenience the rural and semi-urban population to shift from fiat to digital form of currency until and unless a strong Government system is placed properly for monitoring entire flows of digital currency.

## 6.5 Acceptance of CBDC

There is various literature that has attempted to write a key definition of acceptance in terms of digital payment systems. However, it seems like acceptance is rather a variable that is mostly defined by numerous other factors that influence them than having keywords. An empirical study done by (Shailza, Madhulika P. Sarkar, 2019) proves various factors impact the intention to adopt/accept such as compatibility, security, perceived risk, trust, usability, and mobility as studied. Literature by (Surabhi Koul, Sahil Singh Jasrotia, and Hari Govind Mishra, 2021) attempts to define acceptance of digital payments using the technology acceptance model (TAM) as a theoretical base to hypothesize and test an integrated model. It has been identified that along with the digital payment drive, a campaign in rural areas, and providing appropriate platforms RBI also needs to provide the right knowledge and skillset required on how to access the various digital payments.

The pandemic due to Covid-19 was an event that shook the entire globe in an unpredicted manner. It had disrupted almost all sectors of the economy leaving an unforgettable impact. One of the impacts it left was the push to marginalize cash transactions, but not so much to eradicate it (Sandeep Kaur, Nidhi Walia, 2021). However, there is a need for widespread behavioural change, financial literacy, and awareness and acceptance to grow. Due to the expansion of digital payments, the adoption received a lot of attention from academics and practitioners stating that various aspects influence their usage and acceptance. Perceived risk is one factor that seemed to be an obstacle to adoption (Alaa Mahdi Sahi, Haliyana Khalid, Alhamzah Fadhil Abbas, 2021).

Although there seems to be the adoption of digital payments, literature evidences the fact that the supply and usage of cash don't seem to reduce (Carlos A. Arango-Arango, Nicolás SuárezAriza, 2020). The question of why cash does not fade away through the adoption seems to be rising has been studied which proves that the convenience and ease of usage, made cash more reliable. There is evidence that it is a simultaneous growth in both the demand for cash and the digital payment network around the world, which helps show a positive impact of growth if the focus is turned towards one. Following the bottom-up approach of our paper, we also find evidence that only 18% of the population is connected, the remaining population is still at a slower pace in terms of adoption due to multiple factors such as infrastructure, low levels of trust, and risk. From the TAM model used in their paper to understand the acceptance of digital payments, it was found that various factors influence or have an impact on the acceptance or adoption of digital payments. constructs like social influence, perceived risk, and perceived ease are the prime factors driving the acceptance of digital wallets (Surabhi Koul, Sahil Singh Jasrotia, Hari Govind Mishra, 2021).

Taking into consideration the fact that the implementation of Central Banking Digital Currency

in India is at its initiation stage and is completely inclusive of digitization, the question of acceptance is also an important factor to consider. We have attempted to analyze the acceptance in this paper through the qualitative method. The idea of CBDC has been a growing idea on its own in India and the scope of the study has started to grow. We also understand the concept is still sprouting, as such, the implementation is not disclosed by the RBI. In terms of public opinion, there were quite a lot of comments we received from our Focus Group Discussions (FGD).

Though a lot of people in the country believe this shift is necessary, they still resist the shift at the moment. One of our respondents mentioned, "As the ruling govt has an upper hand as they will be regulating it, they will have an upper hand and it will be biased. In terms of regulation, holding rights. The point was who appoints the Governor of RBI- Central govt does. Even in a hypothetical situation they still believe there should be both." Another student from Madurai stated his reason why he wouldn't be ready to accept the shift at the moment, "My decision will be based on tax slabs. Personal commercial benefits. It is not about mentality or mindset; it is about the system where we are taxed for everything (not saying the system is wrong) there are some legal loopholes in the system. We need to reduce tax slabs. Jewelry, functions, etc everything happens only in cash." "We would like to shift but we don't see it practically possible. We are all for digitization, but we would prefer considering it works out." One of the reasons they still feel the existence of cash is necessary is because they believe nothing is as impactful as a real-time experience stated by one of our students we interacted with, "Nothing would work as an experience. We still don't know what would happen. Anyway, not full. If we have the option, we will get to know the positives and negatives of both and if the negatives are too high; we will not be comfortable."

As previous literature states, financial literacy is also a key factor for acceptance "I would still mostly prefer hard cash. I don't want to record my transactions. We should have a clear understanding about it." Looking a little deeper into the conventional mindset of Indians, the traditional old-fashioned mentality also makes a huge impact on the acceptance of digital payment systems. A few pointers as mentioned by our respondents: "I don't want to take anything new which I don't know. It can add value. But I am a little old-fashioned. In a case where everything is fine and people still go without cash, I will go with it. But right now, I do not have any idea about it so I will carry cash." "I am okay with the shift; I consider myself as a pretty tech guy with the available resources. If you go back to my place in my native – and tell them no cash allowed and only phone to make payments – you would see stars and they would not agree, it could be because of literacy and understanding. However, even in a situation given everything in hand, they will have questions due to their mindset; they will not be convinced why they need to shift. But their son will be okay with it. It will be the generation gap." "As an individual, I believe this shift is good, but from the place (Bareilly) I come from 70-80% of people will not be able to handle the shift. The reason is they are not well educated. Literacy is not up to mark. They hold old school mentality, they resist change, just like how the farmer's thing happened." "As a student having access to technology, I would prefer to shift. However, to speak about my background (Thrissur, Kerala) – my parents would accept it, but my grandparents would not. However, in the districts and outskirts, it would be difficult." "They won't prefer in my place (Nagpur). For my parents as well, it is more convenient to carry cash and they are so accustomed to it that they wouldn't prefer to shift. But then it is a gradual shift. Even if the financial literacy is given and they don't understand the debit and credit side of what is going in or coming out from their account, even with gadgets – they don't know how to read it."

Besides, the disadvantages people still feel it is beneficial. "I would accept this change if it is better for the economy, for the development of the country. But most of the students prefer digital payment and the place as a whole would shift. Not for personal benefit, but for the benefit of the country in terms of money laundering, etc" "It would be very convenient for us if it is digitized." "The Benefit is basically that all transactions would be recorded and there would be no corruption. It can have an impact on the economy. The government should bridge the gap first and only then they will implement it." "Though Himachal is in India, they still live like a separate part. If there is a shift it is easier for me, If I have bundles of cash, for safety reasons digital currency would be easier. There will be fewer thefts. We will need to shift in the long run."

"The thought process behind is good. But the cons are higher than the pros by infinite times." From the above analysis of literature and focus group discussions, we understand that there is a huge population that is aware of digital payment systems, one group of people have the resources, few others know the technical aspect of it, and few others are ready to accept it. However, all this is subjected to various factors. Though they believe it will have its benefits, it still comes with its disadvantages which need to be the focus of the government. From our study we believe, we can provide the right analysis required, focusing on the bottom-up approach.

## **7 Conclusion**

CBDC is intended to complement the existing central bank medium of exchange. With the implementation of Central Banking Digital Currency, we believe this could make way for future developments. We intend to further study the implementation of CBDC – phase-wise strategic implementation with the help of global exhibits from other countries where the CBDC has been successfully implemented, possibly with minimal drawbacks.

Financial development and digitization are crucial for the rapid economic growth of an economy in promoting efficient individual or economic investment decisions of financial resources available in a country. A centralized banking system in the country helps improvise the financial development of any country. This paper helps understand and capture the transformation and emergence of Central Banking Digital Currency in India following a Bottom-Up Approach with a global perspective. It focuses on comprehending the current scenario of the digital payments system in India and various other factors that impact the same, such as Technical Know-how, Trust and Belief, Acceptance and Awareness Level, Financial Literacy and Inclusion, Infrastructure starting from tier 3 and tier 2 cities, move up the ladder in tier 1 cities and its influence on the emergence of CBDC.

The qualitative method through focus group discussion (FGDs) covering various geographic locations across the country focuses on respondents from tier 3 and tier 2 cities widely and is opted to understand the opinions of the common public regarding the implementation of CBDC. From our study we notice that there is one lane where digitization is growing as stated in previous pieces of literature; the other where digitization has its limitations. We believe that these limitations have given way too many illegal corrupt activities where a part of the country has been taking these as loopholes to escape the financial system. As such, from our study, we would like to highlight that the implementation of CBDC is required for the current scenario which would be a probable solution as this would mean that every penny will now be tracked by the RBI – highly regulated and that every rupee that goes in and comes out of every account

is tracked and there is absolute transparency that it does not give way for any corruption or financial crimes. However, the further argument in this paper is that there is a gap that exists in the system which needs to be bridged.

Existing literature evidence facts to help understand the level of acceptance and awareness of digital payment systems and the growth of digitization in India. Whilst the growth of the digital world is rapidly expanding day by day, as stated previously we also note that there are a few drawbacks to each of the factors identified. Focus on identifiable factors such as technical know how, trust, and belief, acceptance and awareness level, financial literacy and inclusion, and infrastructure are the need of the hour. Technical development and testing at the large to small scale level are required at every regional concentration. To ensure national security and financial security, the government implementing agencies taking such assignments of CBDC need to initially adopt basic models and test comprehensively to reduce the adverse impacts on monetary policy and the existing banking system.

With the implementation of Central Banking Digital Currency, we believe this could make way for future developments. We intend to further study the implementation of CBDC – phase-wise strategic implementation with the help of global exhibits from other countries where the CBDC has been successfully implemented, possibly with minimal drawbacks.

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# Impact Of Coronavirus Pandemic on Individual Traders' Trading Pattern in Indian Stock Market

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## **Abstract**

*The pure volatility and fluctuation in world-wide stock markets, witnessed because of the novel coronavirus pandemic, has jammed traders off guard in the last few weeks. There is a need to find out in what way traders can stay harmless in a virus-infected market. The present study aims to focus on potential impact of COVID -19 on the Indian Stock Market and also the study addresses how to stay sanitised in virus-affected stock markets. Now, India is concentrating on safeguarding the people from health threats, providing the relief to the poor people, ensuring job continuity and so. On the other hand, Foreign Institutional Investors (FIIs) are constantly removing money from the Indian market. BSE Sensex and NSE Nifty witnessed a sharp fall in the stock market due to the COVID -19 threats across the global market. It is difficult to forecast how the Indian Stock Market will move. When there is fear, traders tend to take their judgments emotionally, rather than rationally. This paper tries to address these issues. The study information has been collected from secondary source in order to gain in depth knowledge on impact of COVID -19 on individual traders trading pattern in Indian Stock Market. The final outcomes of this study are derived from the*

*collected facts and required suggestions are given to retail and institution traders to stay healthy in Indian Stock Market.*

**Key words:** Indian stock market, COVID -19, NSE Nifty, BSE Sensex, GDP, individual trader, pandemic, volatility.

## **1. Introduction**

Indian Stock Market has been witnessing major slow down over the past few months. There was a strong hope for recovery in the last quarter of the current financial year. COVID

-19 has made the recovery extremely difficult to Indian stock market. Indian stock market has faced the worst among the world-wide stock market. India stock market has lost 26% in USD return percentage terms from February 1 to April 9. However, the COVID -19 threats began in China in Dec 2019, China has been least affected with just 3% in USD return percentage terms in the stock market between February 1 and April 9. It has already infected over 9, 70,000 people, over 200 countries affected and claimed over 50000 lives among global.

### **1.1 Objectives of the study: The following are the objectives of the study.**

- A To study the impact of COVID-19 on Indian stock market as well as Global stock market
- b To identify short winners and losers Sectors in the Indian stock market
- c To find out impact of COVID 19 on individual traders' trading pattern
- d To provide valuable suggestion to trade efficiently in Indian stock market

## **2. Review of Literature**

Since the formation of Indian Stock market (BSE and NSE), they have seen a number of booms and crashes. The major Indian stock market crashes were happened in the following years 2000-2001, 2008-2009 and 2020.

**ShubhamRaj** revealed that Corona Virus cases increasing in India and other countries, claiming lives and forcing trades to lockdown. Sideways, with that a constant removal of shares by the foreign traders is also weighing on trader sentiments.

**International Monetary Fund (IMF)** report clearly mentioned that impact due to the COVID 19 pandemic will lead to global recession. Covid-19 extremely changes the outlook for economy and stock market in many ways such as digitalization, cash is the king etc.,

**Mani** explained that stock market always moves in cycles (up and down) and stock market corrects itself after every peak. Study result finds out that every 10 years there is a correction.

**SamieModak** said that biggest market fallforever leads India worst performing market in the global market peer. Traders were frightened of the unprecedented trouble to business activity forcing the country into a lengthy recession if the outbreak did not stem

### **3. Research Methodology**

The current Study is descriptive in nature. In this Study, the researcher has worked based on collected secondary data, which has been collected from various secondary sources like magazines, newspaper, reports, textbooks and website etc. A sample period of the study is from December 2020 to April 2021. Software used for tabulation, graph and analysis are MS-Excel and SPSS(Statistical Package for the Social Sciences).

### **4. Analysis and Discussion**

Impact of COVID-19 on World Wide Stock market

The global economy has been undergoing substantial slowdown over the past few months. Now, the impact of covid-19 has presented new challenges for global as well as Indian economy such as demand and supply side impact, impact on financial institutions and markets, impact on foreign trade etc.,

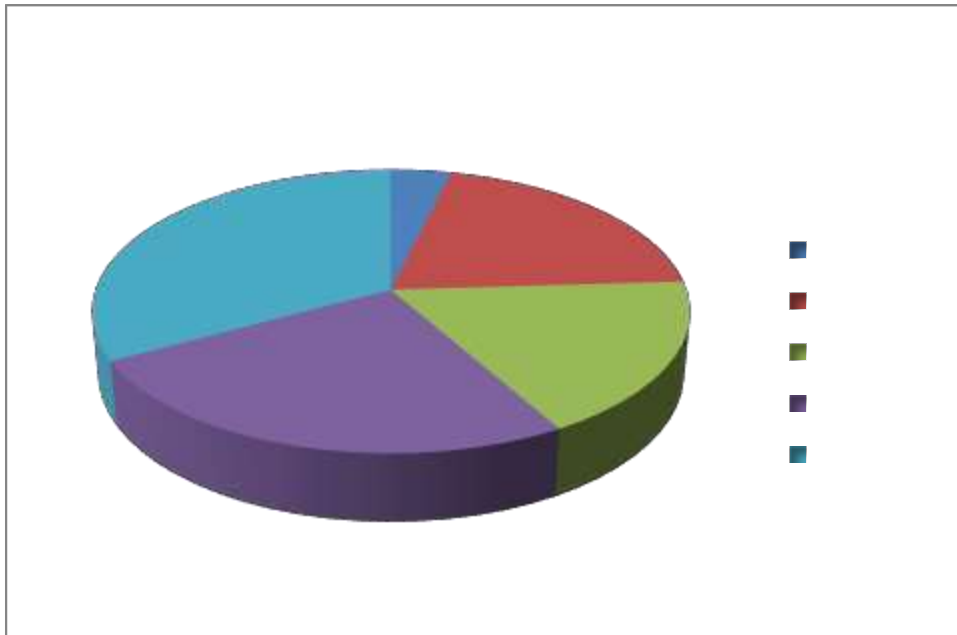
**Table-1** Coronavirus impact: India highest- affected market and China least affected market



**Country USD Returns %**

China 3% MSCIEM 16% USA 14% Europe 20% India 26%

**Graph-1** Coronavirus impact: India highest- affected market and China least affected market



Indian market has the highest infected market among other countries globally. Indian stock market has lost 26% in USD return percentage terms from February 1 to April

9. However, the COVID -19 threats that began in China in Dec 2019, it has been least affected with just 3% in USD return percentage terms in the stock market between February 1 and April 9.

**The Global Market in Uncertain Place to Manage Covid-19 Threats**

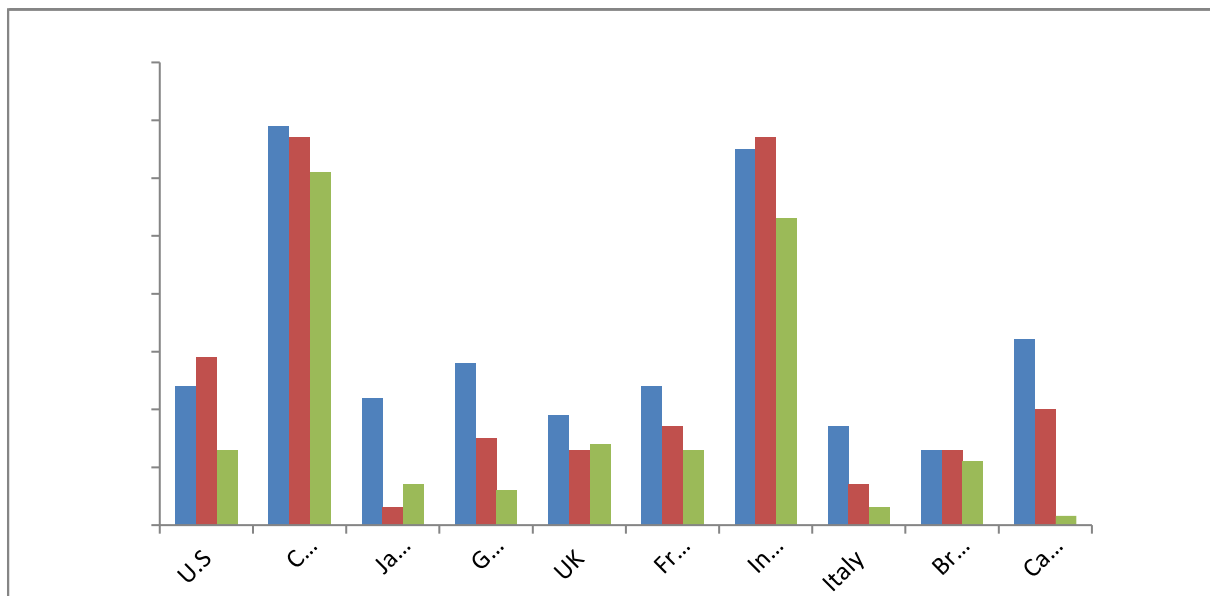
The world-wide market was already in uncertain place in 2019; threat of world recession in 2020 is very high as countrys' lockdown market functions to control the spread of Coronavirus. Top 10 countries were identified from global market by real GDP growth rate percentage.

**Table-2** The Global Market in Uncertain Place to Manage Covid-19 Threats

**Top 10 Countries by**

<b>GDP</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
U.S	2.4	2.9	1.3
China	6.9	6.7	6.1
Japan	2.2	0.3	0.7
Germany	2.8	1.5	0.6
UK	1.9	1.3	1.4
France	2.4	1.7	1.3
India	6.5	6.7	5.3
Italy	1.7	0.7	0.3
Brazil	1.3	1.3	1.1
Canada	3.2	2	0.16

**Graph: 2 The Global Market in Uncertain Place to Manage Covid-19 Threats**



India GDP trend percentage (5.3) shows that it is better than most of the global countries. However the downtrend of developing country may impact on Indian market performance. There is a crucial need to mobilise resources to stimulate the Indian market as well as global market.

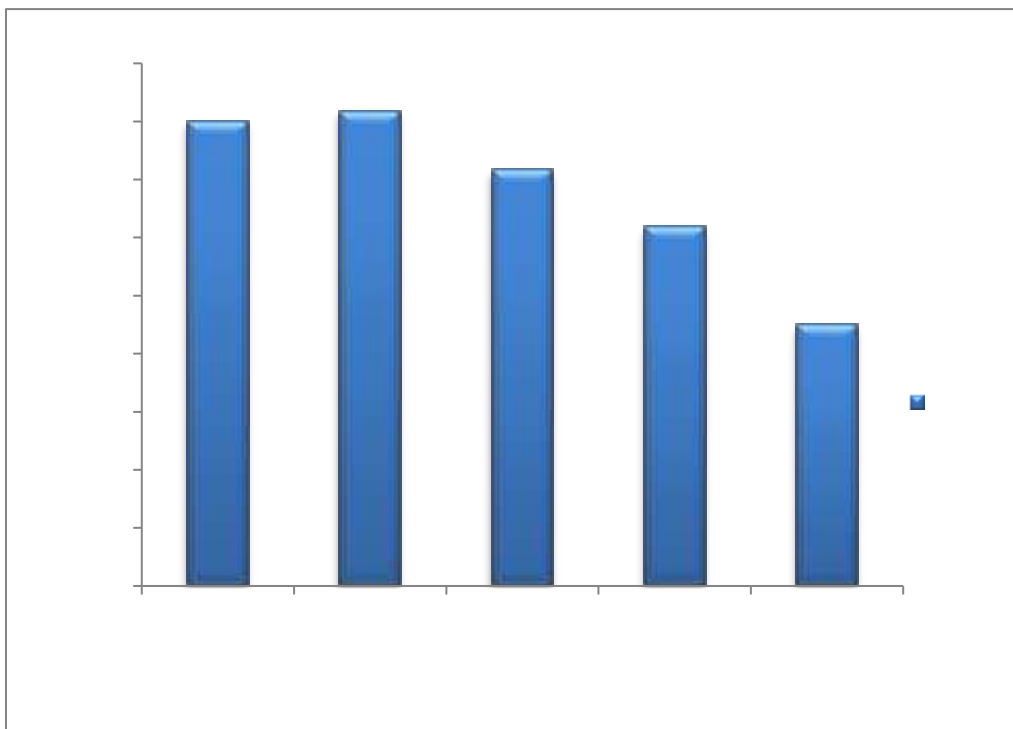
### Impact of COVID-19 on Indian stock Market

India's real GDP development rate stated to its lowermost in over six years in third Quarter 2019-2020 and COVID-19 posed fresh challenges. Three major contributors of GDP will get affected because of COVID-19 which includes consumption, investment and external trade.

**Table-3** impact of COVID-19 on India's GDP

Year	2015-16	2016-17	2017-18	2018-19	2019-20
GDP%	8	8.17	7.17	6.19	4.5

**Grap-3** impact of COVID-19 on India's GDP



### Short Term Winners and Losers in the Indian Stock Market

The impact on COVID -19 in the Indian economy is likely to be high due to lock down, lower consumption and lower business investment. The lock down is possibly to have a substantial impact on various sector functions. COVID-19 has made some of the sector to win in short term which includes Medical Supply & Services, Personal & Healthcare, Food Processing & Retailing and ICT etc. Side way COVID-19 has made

some of the sector to losers which includes Tourism & Leisure, financial services, aviation, education and automobile etc.,

The picture reveals that the stocks to be considered as Potential Winners are to be considered as essential services bought by the consumer even amidst COVID-19 threats and lock down. The situation also forced consumers to over stock on basic products like wheat flour, rice, and lentils etc. This pandemic situation results in food processing & retail industry to gain in overall market. E-commerce sector will also face the challenges on supply chain for delivery of goods and E-commerce companies need to prepare their staff with the suitable resources to accomplish operations remotely with little or no interruption. In the same way medical sector and personal healthcare sector also resulted in potential gain. Thus, short term traders buy and sell these products for their successful trading in COVID-19 pandemic situation.

This economic crisis is more risk than earlier situations like 2000-2001, 2008-2009. Aviation, tourism & leisure industry has been the first industry to be affected due COVID-19 pandemic. During these lock down period many sectors like Automotive, Construction & Real Estate, financial services and education are impacted badly. Recession due to Covid-19 pandemic in Global market has created many sectors such as Financial Services, Construction

& Real Estate, Automotives, Aviation, education and Tourism & Leisure as 'Potential Losers' as they could not perform well in this crisis. Foreign Institution Investors (FII) have also started withdrawing their shares in these sectors. The traders in India too have started withdrawing their shares in the sectors of 'Potential Losers' to safeguard and enhance their portfolio in the Stock Market.

### **Impact of COVID-19 on Traders' Trading Pattern**

Often, Indian stock market and global market fall causes a recession. That is even more likely when it is combined with a COVID-19 pandemic and traders' yield pattern. In order to protect their trade portfolio, retail traders are focusing on mentioned five steps such as get off margin, increase cash.

Step-1: Get off margin

Step-2: Raise cash

Step-3: Follow sound routine investment

Step-4: Follow key buy rules

Step-5: Follow key sell rules

Most of the traders' trading pattern is to buy now though the markets are scare on fear of a financial crisis in 2020 due to COVID-19 and then sell once the covid-19 comes under control.

### **Suggestions:**

- Traders need to realise that which stock perform good due COVID-19 pandemic.
- Traders need to concentrate on pharma, health care and FMCG Sector Company shares which are likely to gain in virus infected markets.
- Traders need to avoid more affected sector company shares for short term trading like tourism, aviation and automobile.
- The Indian stock market is also providing the opportunities for speculator who anticipates taking returns of the volatility market.
- Traders need to Sanitise but trader need not panic, who panic sell during this crisis stage might end up losing.

### **Conclusion**

The present study illustrates how markets and traders are adjusting to the quick rise of COVID-19 impact on the market. Crisis on Indian stock market is a story with an uncertain ending. However COVID-19 introduced new challenges to the traders and economy. Current Indian stock market fall is the best buying opportunity for traders. In this market, individual traders need to sanitise but traders need not panic about their trade activities. Once trader is in panic, it leads to sell during this crisis time might end up losing the money in the market. Traders do not have to be keener than the break; traders have to be disciplined than the break.

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# An Analysis of E-banking – A Sustainable Development in Banks

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## **Abstract**

*Indian banks have leveraged technology and introduced innovative banking product and services to attract and retain the customer for sustainable development in Banks. E-banking is the automated delivery of new and traditional banking products, services directly to the customers through electronic, interactive communication channels, while E-banking services bring down the cost per transaction, increase efficiency by reducing workload of staff, they help to increase accuracy, speed, save time, money and effort of customers. Thus E banking services impact the customer services and leads to better customer satisfaction. They enable the bank to transact more business by offering various services in cost effective way on one side and to get more customer satisfaction on the other. To analyze the relationship between demographic variable and perception towards e banking services, a structured questionnaire used to collect the data from a random sample of 50 customers from State bank of Mysore in Bhadravathi, Percentage analysis and chi square test are applied for data analysis and interpretation. Finally, it attempts to offer suitable suggestions and conclusions to enhance the awareness of E-banking services.*

**Keywords:** Banking Premises, Customer Preferences, Technology savvy, Sustainable development etc.,

## **Introduction**

Today Indian banks are as technology savvy, technology has greatly helped the banking sector to smoothen their interaction with the customer, Banks are using the electronic technology to meet the ever increasing competition in banking which has converted the traditional brick and mortar banking into Electronic Banking with rapid advancement in information technology, alternate channels are made available to customers. E-banking is the automated delivery of new and traditional banking products, services directly to the customers through electronic, interactive communication channels. E-Banking is the electronic bank that provides the financial service for the individual client by means of internet. Now days E-banking is common trend in our country. It is help to speed transaction as well as easy transaction. E-banking is an

emerging growth and exposure in the field of information and technology (IT). Now days every transaction is done electrically using the Electronic Computerized System (ECS) and through various E- Channels like Automatic Teller Machine(ATMs), credit cards, debit cards, Internet Banking, Mobile banking, Tele Banking, Electronic fund transfer(EFT), Electronic Trading.

### **Meaning of E banking**

Internet banking or E-banking means any user with a personal computer and a browser can get connected to his bank website to perform any of the virtual banking functions. In internet banking system the bank has a centralized database that is web enabled. All the services that the bank has permitted on the internet are displayed in any information. The term Electronic Banking popularly called as internet banking. Banks are effectively doing their work without much more difficulty. In modern days most of the customers are aware of electronic banks and also E-banking delivery channels which are one of the powerful tools to the banks to satisfy the customers' needs because of their safety & security measures when a bank adopted this kind of updated technology. These banks can reach their financial goals easily. - Banking Services

### **Automated Teller Machine (ATM S)**

ATMs have become the order of the day in banking, though they were evolved as novel cash Dispensers, now they have emerged as a marketing tool to 'target the masses. There are about 9500 off-site and on-site ATM's of many banks are nothing but virtual branches, as customers, can conduct any transactions, through the touch screens, they are user friendly and they have mass Acceptability. They can effectively, reach, out a large customer base at low cost. At present, banks have started outsourcing and sharing of ATM. Services to 'reduce cost. Most banks are used to cross-sell other products also so as to nut the varied requirements of customers, Banks have started dispensing. Railway tickets, Air tickets, m movie tickets, etc, through ATMs, Voice Activated ATMs, ATMS with finger print scanning technology. Etc, are on the move, if they become operative, they can saved the customers from the hassle of carrying a card. In future, a bank's ATM would function like round the clock Delivering more on non-cash transactions, thereby reducing fixed and operating costs.

### **Tele-Banking**

Tele-banking is increasingly used as a delivery channel for marketing banking services. A customer can do entire non-cash related booking over the phone anywhere and at any time. Automatic voice recorders (AVR) or ID numbers are used for enduring. Tele-banking services have added convenience to customers.

### **Internet Banking**

Internet has enabled banking of the click of a mouse. Internet banking is all poised to emerge as the most profound electronic, channel in the near future. Internet banking reduces banks operating expenses mainly due to savings on prohibitive estate costs and expensive staff salary. It is estimated that the cost per transaction in internet banking will be only one –tenth of a regular branch transactions. Internet banking is a platform for electronic delivery of banking services to the customers. In inherent banking, customer of a bank with ape and a borrower,

can have accounts to his bank's website, and therefore, perform various banking functions. Thus, he can avail of the bank's services from anywhere and at any time. With the drastic fall in cell phone tariff and emergence of some less, connectivity, between fixed, and mobile lines, tele banking or mobile banking is set to 'emerge' as one of the Cost effective delivery channels in the near future. The call free number would also gain popularity as an important delivery channel. Successful adoption of less technology would help banks to offer not only anytime, anywhere banking but also any device banking.

### Real Time Gross Settlements (RTGS)

The RTGS is a new system of payments evolved in the Indian banking environment, its main objective is to enable online clearing and settlement of payment on a Real-time basis across banks in different cities, the RTGS is an upgraded technology aimed at reducing dependence on payments through cheques it is radically different from the present day paper based clearing system. It not only permits net settlements between banks but also eliminates systematic risk due to advanced technological innovations.

### Credit Cards

Credit card is another facility produced by E-Banking credit card is a product with the help of which a customer can avail various facilities or buy products/services without making immediate payment & that payment could be made at a later stage of time.

### Electronic fund transfer (EFT)

E-Banking has given a system of electronically transferring funds i.e. electronic fund transfer which involves transfer of funds from bank account of another customer electronically. This is done through Electronic data interchange (EDI).

### Electronic Cheque

E-Cheques is a system. This provides more security & reduction in overall cost. E-Cheque facilities in online payment. It needs no clearance charges. Issue of E-cheque is more familiar on various advanced countries.

### Objectives of the Study

- To study the range of value added services offered by banks through E banking channels.
- To know the reasons for opting E-banking services by customer.
- To know the perception of customers for making transactions through E-banking in State Bank of Mysore
- To offer few suggestions and measures to reap the maximum benefits from e-banking services to the customers.



### Hypothesis of the Study

- H0: There is no positive opinion about e-banking services in state bank of Mysore.
- H1: There is a positive opinion about e-banking services in state bank of Mysore

### Methodology of the Study

For the purpose of study both primary and secondary data has been collected .Primary data is collected through a well designed structured questionnaire and discussions with the bank customer. Sample of 30 respondents are identified randomly. Secondary data is collected from various publications, journals, books etc.

### Sample Design

Sample is a small representation of population selected at random basis. For survey 30 customers are selected with the help of random sampling technique for achieving the objectives of the present study

### Tools and Techniques

The present study used simple percentage tables and different statistical tools and techniques such as chi-square test for the analysis and interpretation of data.cope of the Study

This study will be restricted to study only electronic banking services. The geographical location for the study is restricted to State Bank of Mysore, Tumkur branch. The study mainly includes improvement of E-Banking technology and customer satisfaction about E-banking channels.

Table 1:Socio-economic Profile and Opinion of Respondents

Particular	No. of respondents	Percentage (%)
<b>Age</b>		
18-25	20	66.67
26-30	02	06.67
31-40	04	13.33
Above 40	04	13.33
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Gender</b>		
Male	12	40
Female	18	60
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Education qualification</b>		
Up to SSLC	05	16.67
PUC	10	33.33

Graduate	05	16.67
Post graduate	10	33.33
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Occupation</b>		
Business men	08	26.66
Employees	14	46.67
Student	05	16.67
Other	03	10
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Awareness of E-banking services</b>		
Yes	30	100
No	00	00
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Sources through which respondents came to know about e-banking services.</b>		
Friends	06	20
Banker	18	60
Relative	02	6.67
Advertisement	04	13.33
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Opinion about e-banking services</b>		
Strongly satisfied	11	36.67
Satisfied	09	30

Moderate	02	6.67
Dissatisfied	02	06.67
Strongly Dissatisfied	06	26.66
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Securities measures taken to overcome the e- banking problems</b>		
Changing password frequently	05	16.67
Banking suggestion	16	53.33
Frequently checking of a account	08	26.67
Using demo option	01	03.33
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Frequent usage of respondents</b>		
Once a day	06	13.33
Once a week	15	50
Twice in a month	08	26.67

Once a month	03	16
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Benefits of e-banking</b>		
Any where any time banking	19	63.33
Time saving	03	10
Low cost services	02	06.67
Quality services	06	20
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Reasons for consideration E-banking as safest mode of transaction</b>		
Hides customer identity	09	30
Avoids carrying of huge amount	10	33.33
Accessibility of information of all transaction	06	20
Password protection	05	16.67
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Purpose behind using e-Banking services</b>		
Electronic fund transfer	06	20
Cash withdrawal	13	43.34
Shopping	03	10
Balance enquiry	08	26.66
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Reasons for facing problem while working with e-banking services</b>		
Busy network	06	20
No internet connection	12	40
Lack of infrastructural facility	07	23.33
Frequent forgetting of password	05	16.67
<b>Total</b>	<b>30</b>	<b>100</b>

<b>E-banking services use for their requirements</b>		
ATMs	15	50
Internet banking	07	23.33
Telephone banking	05	16.64
E-payments	03	10
<b>Total</b>	<b>30</b>	<b>100</b>
<b>Opinion of customer towards sustainable development</b>		
<b>Yes</b>	<b>27</b>	<b>90</b>
<b>No</b>	<b>03</b>	<b>10</b>

<b>Total</b>	<b>30</b>	<b>100</b>
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**Sources:** Field survey

The above table reveals the profile and opinion of the respondents. Out of 30 respondents, 66.67% belongs to the age group of 18 to 25 years, 60% of the respondents are female, 46.67% are employees, 60% are come to aware about e-banking services through banker, 36.67% opinions that services of E-banking is highly satisfied, majority of the respondents use e banking services twice in a month, 63.33% says that benefits of e- banking is anywhere and anytime banking, 33.33% considers the e-banking is the safest mode because it avoids carrying huge cost, 43.34% use e-banking services only for cash withdrawal, 40% face internet connection problem while doing transaction in e- banking channel , 50% of the respondents prefer ATM among various e -banking channels. 90% of the customer opined that e banking provides for sustainable development.

### Testing of Hypothesis

H0 : There is no positive opinion about e-banking services in state bank of Mysore. H1: there is a positive opinion about e-banking services in state bank of Mysore

**Table 2: The Satisfaction level of respondents of E banking services**

Satisfaction level	No. of Respondents	Percentage(%)
Strongly satisfied	11	36.67
Satisfied	09	30
Moderate	02	06.67
Dissatisfied	02	06.67
Strongly Dissatisfied	06	26.66
<b>Total</b>	<b>30</b>	<b>100</b>

**Table 3: Showing Chi-square ( $\chi^2$ ) value**

Scale	Observed frequency	Expected frequency	Residual	(Of-Ef) <sup>2</sup> /Ef
Strongly satisfied	11	5	6	7.2
Satisfied	09	5	4	3.2
Moderate	02	5	-3	1.8
Dissatisfied	02	5	-3	1.8
Strongly Dissatisfied	06	5	1	0.2
<b>(Of-Ef)<sup>2</sup>/Ef</b>				<b>14.2</b>

**Degree of freedom= $n-1=5-1=4$**

### **Interpretation**

The table value of  $x^2$  for the degree of freedom at 5% level of the significance is 9.488. The calculated value of  $x^2$  is much higher than the table value and hence the result of the experiments does not support the hypothesis. Thus we can say that there is a positive opinion on e-banking services in SBM. The hypothesis is rejected.

### **Findings**

1. E-Banking service attracting more number of young users
  2. E-Banking major customers are educated peoples. It is difficult for uneducated customer for operate.
  3. Majority of the user using E-Banking for amount transfer and other purpose.
  4. In recent days internet connections problems and network problem are become major problem.
  5. Majority of the respondents prefer ATM to do the banking transaction.
  6. The customer perception towards the e-banking services are positive, as they felt it is the safest mode of transaction..
  7. Majority of the respondents using E-Banking services to save time and for easy accessibility.uggestions
1. Bank should an Electronic Banking group to provide guidelines for risk management in E-Banking activities.
  2. Bank should provide awareness program to the customers about their innovative technical services.
  3. Bank should recruit experienced personalities to implement the electronic banking services.

Arrange training programmes for the employees to make them efficient for providing services through E-channels

4. Adopt the new innovative techniques as a result of the social context in which the internet or E-Banking responsibility are use.
5. Demonstration about E-Banking should be provided to the existing customers to promote E-Banking
6. Educate the customers that E-Banking is totally safe.
7. Provide discounts on shopping through E-Banking.

### **Conclusion**

E-banking has become a necessary survival weapon and is fundamentally changing the banking industry worldwide. Banking business has been an advisable part of economy in general and business in particular as a matter of fact, banking has widened its services from traditional area to a number of sophisticated areas like E-banking, computerization, real time gross settlement,

Tele-banking, ATM-Whatever may be the area, banks flourish only when their activities are customer oriented in order to achieve 100% customer orientation they should be aware of customer demands. The present study has focused on the awareness, customer's perception, and effective services provided by banks to the customers. It reveals the fact that the perception, awareness level, and use of e- banking increased in Bhadravathi. Overall this paper provides the complete information about the customer's perception and awareness about the e-banking in SBM, Bhadravathi.

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## Stock Market Does Not Replicate the Real Economy: Evidence of Indian Economy during Covid-19

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### **Abstract**

***“Stock market is not the economy. Stock market is not the economy. Stock market is not the economy.....”- Paul Krugman***

*Above said are the three fundamental rules to be taken care of whenever interpreting the implications of stock prices on any economy, given by the Nobel laureate and a well-known economist. One cannot generalise the health of the overall economy by simply looking at the stock market index. To be precise roughly 3.7 percent of Indian population prefers to invest in equities. This figure is very much less in comparison to China where nearly 12.7 percent of population invests in equities. In contrary to these figures, 55 percent of US population trust stock market as they prefer to invest in stock market either individually or collectively in the form of mutual funds. From this scenario it can be easily understood that in India, one cannot generalise the economy's health just by going through the volatile figures of stock market indices. In this backdrop, the present study is an attempt to find out the various determinants of stock price volatility. Further it also discusses the impact of the recent pandemic on Indian stock market. The study concluded Indian Financial Sector is the most affected sector in comparison to the other sectors of the economy. On the other hand the sectors which have faced the positive impacts includes information technology sector, pharma and consumer goods sector.*

**Keywords:** Covid-19, Indian Financial Sector (IFS), Stock Market, Indian Economy, Stock Market Index

# Behavioural Biases In Financial Decision Making

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## **Abstract**

*Behavioral finance is an emerging field of study which is relatively new and having its provenance from decision theory. Behavioral finance is a multidisciplinary research area that combines psychology and finance and investigates the issues that impact the decision-making process and explains the irrational nature of individuals, groups and organizations. Behavioral finance tries to address those psychological traps that are confronted while making decisions under uncertainty. The main objective of this study is to explore behavioral determinants influencing individual investor's decisions on the financial front. The paper tries to extend the knowledge of how biases, moods and emotions influence the financial behavior of individuals. In conclusion, the paper will provide a future paradigm of behavioral finance.*

**Keywords:** Behavioral Finance, Overconfidence, Anchoring, investors, investment.

## **Introduction & design of the study**

Over the past fifty years, conventional finance theory has assumed that investors have little difficulty in making financial decisions and investors are well informed about prices and they are judicious and persistent. The conventional theory holds that investors are not baffled by how information is presented to them and not swayed by their emotions (Byrne, 2013). But clearly its perceptibility does not match with these conjectures. Behavioral finance has been growing over the last twenty years because of its cognizance that investors rarely behave according to the conjectures made in conventional theory of finance. Behavioral researchers have the view that finance theory should take account of observed human behavior (Utkus, 2013). They use research from the field of psychology to establish an understanding of financial decision-making under unpredictability and develop the regimen of behavioral finance. Provenance and growth of Financial economics, the flux of international markets, and the operation of abettors therein (individuals as well as firms), are topics which are ultimately peruse differently by various people. Over the past 20 years, so many debates have been on-going between 'rationalists' who assume that pecuniary abettor behave rationally, against 'behaviorists', who consider that they behave in systematically irrational ways (MC Guckian,2013). There is a certainly plethora of alternative opinions, advocating psychologically realistic stance in economics and at present we are in a conversion phase between two paradigms (Stiglitz, 2010). Theories developed by researchers in classical finance tend to accept that investors only evaluate risk and expected returns when making investment decisions. Indeed, staple approaches in financial economics base certain assumptions about abettors' psychology, and typically this has been considered as a great brawniness. In the field of behavioral finance, the role of human oversight in modeling markets is of significant



importance, and it is felt that contemporary finance has ignored the importance of emotions and emphasized the rationality of decision making on mathematical models. The psychologists consider the rational model to be an impractical canon for human understanding. Psychologists believe that the terminology of behavioral finance is that it is centrally the pertinence of psychology to study human psychology in finance or investing – itself is an inflated expression; finance is intrinsically behavioral in nature. A wider range of components and instinctive elements, which are important to the financial decision making process of domiciliary and the cumulative inclination of financial markets, are taken into account by these psychologists.

Behavioral finance is akin to the terminology of ‘wet water’ – it is inherently known that the water is wet. This has mostly manifest because it is thought by many that evaluating real world economic behavior without including the findings of psychology is like dealing with quantitative relationships without using readily available techniques of mathematics (Schwartz, 2007). Keynes wrote about the impact of psychology in economics more than forty years ago. Furthermore, Paul Slovic professor of psychology propagated a detailed study of the investment mechanism from a behavioral point of view in 1969. However, in late 1980s that BF began to get acknowledgement among professionals. At that moment, Professors Richard Thaler at the University of Chicago, Robert Shiller at Yale University, Werner de Bondt at the University of Illinois, and Meir Statman and HershShefrin at Santa Clara University, among others, began to propagate research pertinent to Behavioral Finance (Olsen, 1998). These scholars began to explore a host of pragmatic findings that were not persistent with the view that market returns were set in consonance with the Capital Asset Pricing Model and the Efficient Market Hypothesis. Supporters of Traditional Finance reg was to allow a better perspective of the anomalies present in investors’ behavior by coordinating psychology with finance and psychology. However, it was not prior to Professor Daniel Kahneman of Princeton University was awarded in the year 2002 with Nobel Prize in economic sciences that Behavioral Finance gained propulsion. Thereupon, it was not prior to researchers initiated to discover pragmatic results that were not persistent with the efficient market theory that Behavioral Finance became popular.

Consequently, it is thought that philosophical models in finance should be verified against the experimental testimony, i.e. financial inputs; this entails that financial experts employ more of a bottom up approach, whereby cognitive and poignant states are taken into consideration. This prospect develops a radically unique and relevant way to explain financial markets and its behavior. Behavioral finance models contend that there are more inherent important determinants in the decision making process, relevant to how we should invest, value resources and accustom for risk. cognitive based conjecture, which derives from individual/collective psychology and decision making analysis, are more revealing and it is thought that a larger variety of determinants introduce distortions and prohibit rational financial decision making from taking place on a cumulative scale. In short handed these decrees were aberrant, and thus called them anomalies. Behavioral Finance main benefaction behavioral finance is the study of the impact of psychology on the behavior of economic agents and the subsequent effects of this behavior on financial markets (Sewell, 2007).

Recent research shows that the average investor makes decisions based on emotions, not on logic; most investors buy high on speculation and sell low in panic mode. The Boston-based Dalbar in its 2007 report “Quantitative Analysis of Investor Behaviour” found that in the past 20 years the American S&P 500 Index returned on average 11.8% pa, while the average investor earned 4.3% pa-substantially lower returns. People are thought to be selfish and only interested

in their own welfare (utility function maximization), to have complete access to all available information, to be well informed and to possess sufficient reasoning ability to solve complex problems (Schwartz, 2007). Behavioral Finance studies decision making under uncertainty and asks the question of how an individual should choose various investment options when faced with uncertain outcomes.

To examine the financial decision making process, it calls for an analysis to be carried out to study the role of behavioral finance in financial decision making: evidence from India. The study will be conducted to know the impact of various behavioral biases on individual investment management.

## **Review of Literature**

Understanding behavior of economic agents has gained high momentum in academic research due to increasing volumes of financial investments across the world. Daniel Kahneman, recognized as the father of Behavioral Finance, won the Nobel Prize in the field of economics in 2002 for his extraordinary work in prospect theory. The aim of this section is to present some of the key literary works of various scholars in the field of behavioral finance. Firstly, literature related to evolution of behavioral finance is conferred. Secondly, comparison between traditional finance and behavioral finance as well as behavioral finance in India is presented. Thirdly, the important doctrine of behavioral finance (heuristic, prospect, and herding) is included to have a comprehensive description of this discipline and its impacts on the individual investment decision making and performance.

Kahneman and Tversky (1974) in their study concluded that there are three heuristics: Representativeness, Availability and Anchoring which could improve judgment and decisions in situations of uncertainty. The study provides a rigorous subjective interpretation of probability that is applicable to unique events and is embedded in a general theory of rational decision. The random sample of 100 professionals-lawyers and engineers were selected and subjects were shown brief personality descriptions of several individuals. The results drawn about behavioral biases were based purely on probability distribution.

Nofsinger (2001), in his study, concluded that traditional finance over the past few decades is based on the assumption that people make rational decisions and that they are unbiased in their predictions about the future. A rational investor can be defined as a one that always (i) updates his beliefs in a timely and appropriate manner on receiving new information; (ii) makes choices that are normatively acceptable. But the Financial Crisis of 2008 that originated in the USA and global recession has raised the question in everyone's mind whether people are really rational? A vast majority of economists, and economic seers occupying prominent seats in governments and financial intermediations were entangled unawares by this and aftermath actions like insolvency and failures. Even after the crisis had begun, many of them were not able to analyze the magnitude or depth of it. Going a bit more into the past, the case of a hedge fund by the name of Long Term Capital Management (LCTM) gain special mention attributable to the fact that, despite being partnered by an ex-vice chairman of the Federal Reserve Board, two Nobel Prize winners in Economics, and having 24 employees with Ph. D.s., it plunged into failure. Failures of economists, and consequently the theories they swear by, on various occasions has put forward the question: Are people really behaving rationally in taking financial decisions? Or are they likely to be driven by rounds of emotions like fear and greed which could lead to bad decisions? In support of this study Bernstein (2001) says that

the “evidence concedes aped motifs of impracticality, divergence, and inability in the ways human beings arrive at decisions and choices when faced with uncertainty”. Nofsinger (2001) says that the assumptions of rationality and objectiveness of people have been truncated by psychologists for a long time.

Barberis and Huang (2002) have attempted to study the aspect of loss aversion into utility functions. Loss aversion refers to an approach in which investors suffer greater disutility from a wealth loss than the utility from an equivalent wealth gain in absolute terms. The study shows that loss aversion in individual stocks leads to excess stock price fluctuations. This happens because agents’ response to past stock gains is to increase their desire to hold the stock by lowering the discount rate, moving the stock price in an increasing way. Further, loss aversion effect also obtains because stocks with high market/book are ones that have done well and thus require lower returns in equilibrium. Grinblatt and Han (2002) quibble that loss aversion can also help explain momentum. Specifically, past gainers have excess selling pressure and past losers are not disdain as quickly as they should be, and this causes under reaction to public information. In equilibrium, past gainers are underrated and past losers are overrated. This creates an impetus as the misevaluation antipode over time.

Barberis&Thaler (2003) in an ideal framework concluded that security’s price equals its “fundamental value” as frictions do not exist and agents seem to be rational. The fundamental value is said to be the discounted sum of expected future cash inflow and investors are capable of analyzing all accessible information accurately and the discount rate is consistent with the accepted preference specification. The Efficient Markets Hypothesis (EMH), which supports the opinion that actual prices reflect fundamental values, affirms that prices are right as they are determined by agents, who are sensible in preferences and understand Bayes’ law, which relates to conditional anticipation. Moreover, an efficient market is the market where average returns cannot be greater than what is warranted for its risk despite whatever investment strategy is applied. According to EMH, although not all investors are rational, the markets are assumed to be rational. Furthermore, instead of foreseeing the future, the markets are assumed to make unbiased forecasts. Being different from this theory, behavioral finance believes that sometimes, financial markets do not have informational efficiency (Ritter, 2003). Due to the fact that people are not always rational, their financial decisions may be driven by behavioral biases. Thus, studying behavioral finance plays an important role in finance, in which cognitive psychology is hooked to discern human behaviors.

Chira, Adams and Thornton (2008) studied the cognitive biases and heuristics, which the business students are subject to. The main purpose of the study was to look at how influenced the students are, by biases, heuristics, and framing effects. The survey was conducted to a sample of sixty-eight students at Jacksonville University in USA by conducting a questionnaire and collecting pragmatic evidence about both undergraduate and graduate business students’ own perceptions of bias. The findings concluded that students are less disposed to make the aberration of being overly confident and optimistic when there is more objectivity involved in making the judgment. Students did not exhibit illusion of control tendencies and a tendency to be subject to the familiarity heuristic.

Seppala (2009) examines the effects of three behavioral biases on investment advisors. This bigotry is hindsight bias, cockiness and self attribution bias. A survey study is consummate to determine how the considered biases affect the financial advisors. The same survey study is

also consummate for two control groups for comparative intent. Furthermore, the chattels of individual thinking style and cognitive abilities on the vulnerability to behavioral bigotry are studied. The data in this inspection is gathered in controlled field surveys. The surveys are consummate for three separate groups of population that are financial professionals, university students and employees of engineering companies. The participants of the survey replied on a questionnaire that encompasses financial market related reckoning tasks. The main finding of this study is that people in general uncover behavioral biases but the intensity and impact are afflicted by experience and other attributes. Comprehensively, the outcomes of this study provide relevant new information on behavioral biases.

Subhash (2012) explored to find the impact of certain recognized behavioral finance determinants, namely, Overconfidence, Representativeness, Herding, Anchoring, Cognitive Dissonance, Regret Aversion, Gamblers' Fallacy, Mental Accounting, and Hindsight Bias, on the decision making process of investors in the Indian Stock Market. Primary data for analysis was gathered by distributing an organised questionnaire among investors who were assorting as juvenile and veteran. Results obtained by analyzing a sample of 92 respondents, out of which 53 admitted to suffer a loss of money of at least 30% because of the crunch, revealed that the degree of exposure to the biases separated the behavioral pattern of juvenile and veteran investors. The study concluded that Gamblers' Fallacy, Anchoring and Hindsight biases were seen to affect the young investors significantly more than experienced investors.

Suresh (2013) conducted a study which concentrates on the impact of behavioral finance on individual investors and money markets. The approach of money markets is deceitful as the market itself does not consist of cash, but objectives having high liquidity are therefore indicated as money. The relevant behavioral finance models addressed in this study are Anchoring Theory, Herding Theory, Prospect Theory and Regret Theory. The researcher of this study is an uneducated investor. Examining the issue from his own point of view is expected to provide useful knowledge for the future investment decisions. Studying the correlations of investment and behavioral finance theories embellish uneducated investors to be cognizant of the related investment strategy they have implemented. In the long term, identifying these issues may ease the distortions on money markets. The collection of data was conducted through primary and secondary sources. Primary data consists of a self-completion questionnaire conducted on the beginner investor web page called as "Investor Posts". The methods adapted in the primary research were semi-quantitative. The research done in this dissertation provided areas of focus and development for uneducated individual investors in order to make successful investment decisions in the future. It suggested self education as a form of mitigating irrational aspects of one's decision making.

In sum, behavioral finance literature has grown by leaps and bounds in recent years. However, much work remains to be done in the field. In particular, the literature could shed specific light on which agents are biased and whose biases affect investments. There is also room to analyze the influence of behavioral biases on individual investment decision making. This study aims at discussing two relevant aspects of behavioral finance. Firstly the study discusses the factors causing irrational behavior and also addresses issues identifying the causal factors for investment behavior of people.

### **Objective**

a) To study the theoretical framework of the genesis of behavioral finance.

b) To identify various behavioral factors/ variables this may have a probable effect on investment decisions.

### **The History of Behavioral Finance**

The academic discipline of behavioral finance commenced in 1979 by psychologists Daniel Kahneman and Amos Tversky develop prospect theory. Prospect theory introduced a practice for having an acceptance of how risk impact financial decision-making. Amos Tversky and Daniel Kahneman introduced the discipline of behavioral finance through their contribution in the work of studying psychology of risk. Their work in the discipline of behavioral economics confronts the basic supposition of rationality, which is intrinsic in the classical economic model of decision making. Tversky and Kahneman studied three major areas: Risk attitudes, mental accounting, and overconfidence (Litner,1998).

In 2002, Daniel Kahneman who is considered the father of behavioral Finance received the Nobel Prize in the field of economics. Richard Thaler was another initial contributor to the discipline of behavioral finance. Richard Thaler, in the 1980s, elongated the scope of behavioral finance by establishing tenacious connections between psychological and economics principles (Lambert,2006).The area of behavioral finance has developed over the last three decades and it has got a lot of support from academics and research institutions.

### **The Russell Sage Foundation**

One of the biggest adherents of the field of behavioral finance and also behavioral economics is the Russell Sage Foundation. The Russell Sage Foundation is a non-profit foundation that provides research and development support to academicians and finance professionals. The Russell Sage Foundation started its Behavioral Economics Program in 1986 with the mentioned goal of “strengthening the accuracy and experimental and observational reach of economic theory by blending information from interrelated social science disciplines such as psychology and sociology.” The Russell Sage Foundation's Behavioral Economics Program entrenched itself at the junction between economics and cognitive psychology and dedicated the program’s supplies to understand how the real-world financial decisions of investors often contravene the rational specifications in economic theory.

### **Behavioral constituents Influencing Individual investment decisions**

**Risk attitudes:** While classical economic theory contends that investors are loath to liability, behavioral finance holds that investors display erratic and often inconsistent attitudes towards economic risk. Tversky and Kahneman found that investors have an extricate remark point for risk and will be most conscious to risk when that extricate point is achieved.

• **Mental accounting:** While classical economic theory contends that money is transposable and commutable, behavioral finance holds that money is not completely transposable for most people. Tversky&Kahneman developed the idea of extricate mental accounts to assess why money is not wholly transposable for most people. Mental accounts, an obscured form of accounting, contain economic resources that for private and often incoherent reasons and are not easily shifted.

- **Overconfidence:** While classical economic theory quibbles that investors are wise decision makers who use the financial information rationally, behavioral finance holds that investors are susceptible to overconfidence and biased decisions. Tversky & Kahneman recognized that investors were often overconfident about investment decisions, overrated the chances of financial success, and overrated their financial and economic knowledge.

## **OTHER BEHAVIOURAL BIASES**

- **Anchoring:** Inclination to anchor anticipation based on reference points that may not have any importance to the value that is being forecasted.
- **Availability bias:** The disposition to form judgments about the anticipation of an event based mainly on the availability of information that favors a certain findings.
- **Confirmation bias:** Searching of information that braces an investor's confidence while contending disposition that may be incompatible or contradictory.
- **Disposition effect:** The inclination to possess losing securities too long and to sell gainers too quickly because of loathing to loss.
- **Framing:** The inclination to take into consideration extraneous information at the time determining return prospect for an asset.
- **Illusion of control:** Individuals' inclination to overvalue the control they have over results.
- **Optimism bias:** The propensity of people to trust that they are better than moderate and that catastrophes are more likely to transpire to people other than themselves.
- **Overreaction:** Seeing arrangements in random events, such as predicting current trends into the future forever.
- **Representativeness:** An inclination to find affinity among sample units whose resemblances are only frivolous and represent the whole population.
- **Under reaction:** A wary to accustom one's expectations to new information.

Investment management companies progressively form behavioral finance teams to assess qualitative factors and concerns affecting the market and investment financial decisions. Behavioral finance funds have become common and lucrative investment vehicles. Investment experts use the concepts and means of behavioral finance to understand the anomalies in the financial markets and explore the anomalies to their benefit. The proposition of behavioral finance can be used in any financial instrument. Behavioral finance conjoins investor decision-making and market operations. Behavioral finance investing can be practiced across investing styles, industry sectors, and stock realm (Stewart, 2006). Despite the validity and eminence of behavioral finance academic and corporate sectors, the argument between traditional finance and behavioral finance remains vigorous (Shiller,2006).

## **Research Methodology**

Major part of the paper is conducted based on a comprehensive study of secondary information through books and articles related to investment strategies and behavioral finance theories. The objectives of the study will be based on qualitative research methods in order to understand the behavioral theories affecting on individuals decision-making processes.

The following sections provide a review of the antiquity of behavioral finance. This overview will serve as a basis for future consideration of behavioral finance and the confrontation to

grandeur economic theory. The concerns related with using behavioral finance to identify investor bias are recognized.

### **Analysis and interpretation Using Behavioral Finance to Identify Investor Bias**

Financial professionals working to assimilate behavioral finance into their habitude face many challenges. In present there is no accepted finance industry and organizations that recognize methodology to distinguish an individual investor's intellectual biases. Essentially, once an investor's behavioral biases have been recognized, financial experts may lack the involvement needed to assimilate these biases during the procedure of deciding about allocation of assets. Most importantly, financial professionals will be asserting by the work of deciding to what extent behavioral finance research is relevant for each investor. Financial experts must decide whether an attempt to change their investor's biased behavior or conform to it. Pompian and Longo (2005) recommend the use of two behavioral finance principles:

- First, financial advisers should conform to biases at high wealth levels and try to correct behavior at lower wealth levels.

- Second, financial advisers should conform to hysterical biases and neutral cognitive biases.

Protocols for assimilating biases in asset allocation decisions will help financial professionals to achieve the following goals: investors naturally behave to readdress the effects of behavioral biases so that they can apt planned asset allocation and comfortably concede by their asset allocation decisions and build the quantitative specification that will let on the financial professional to thrive and alter the investor biases. Eventually, the pertinence of behavioral finance to individual investors is a susceptible process that would aid from the enactment of finance industry protocols and direction (Pompian& Longo, 2005).

### **Conclusion**

Behavioral finance contends that financial decision Making is formed by individual and market psychology. Behavioral finance points the following concerns and inquiry (Taffler,2002):

- What genesis stock market crisis?
- Why is the stock market so buoyant?
- Why do stock prices appear to stampede to atrocious news?
- Why do CEOs and stakeholders often believe their companies are underrated by the stock market?

The discipline of behavioral finance portrays investors in the following manner: Investors are usually impartial in their financial decision-making; investors are known to be over confident of investment decisions; investors are found to recognize to overrate the chances of their success; and investors are known to overvalue their financial knowledge (Litner, 1998). Behavioral finance performs to develop theoretical intuitiveness about investor behavior and establish a system that conjectures the conjectures of investors' behavior.

The discipline of behavioral finance will likely evolve in tenacity and sphere; it will likely continue to provide a strong financial tool. Due to the buoyancy of markets, behavioral finance influential investment is contemplated to be one of many fundamental investment procedures and approaches in a diversified portfolio (Stewart, 2006). The discipline of behavioral finance

is widening to include the discipline of neuro- economics. Neuroeconomics is a field of study that assimilates neurology, economics, and cognitive psychology to understand how people make various investment choices. Neuro economics widens behavioral finance by enumerating the variables of the nervous system as a determinant in financial decision-making. At the end, conclusively, the expansion of the behavioral finance area allows for better consideration of the manner in which psychological parameters influence investment fallout and market performance (Shiller,2006).

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# Performance Evaluation of Artificial Neural Network Algorithm in Financial Market Forecasting: A Comprehensive Survey

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## **Abstract**

*The goal of this survey is to evaluate the performance of Artificial Neural Network (ANN) algorithm in forecasting financial markets. Recently, researchers have shown an increased interest in ANN for the prediction of stocks. The existing survey recognizes the critical role played by ANN in financial market. In the history of stock prediction, the investor's focus has always been on fundamental & technical analysis. This type of analysis is not proven on non-linearity behavior. Thus, the researcher uses ANN and Machine Learning (ML) modeling to increase the accuracy of predictions. The meaningful data patterns are extracted from the research paper. The research paper selection criteria were based on prediction algorithm, time frame, published year and the impact of journal. This straightforward approach gives the clear and unbiased selection method. The first set of analyses investigated confirmed the impact of ANN with respective fundamental analysis and linear model. We further find evidence that- on average recurrent neural networks outperform feed-forward neural networks as well as Support vector machines.*

## **Keywords:**

Stock Market, Artificial Neural Network, Machine Learning, Support Vector Machine Genetic Algorithm Time Series

## **1. INTRODUCTION**

In recent years, there has been an increasing amount of literature on ANN and ML algorithms in forecasting stock markets. ANN and ML algorithm has several advantages easy removal of noise, self-learning and most importantly fast and efficient decision-making. Therefore, ANN algorithms are the most widely used tool to forecast the stock market and it is popular among investors and researchers [1-6].

Several methods are available for stock market forecasting. The performance of ANN algorithm is depending on the indicators and stock market [48-50]. In this comprehensive survey, an attempt is made to elaborate and compare the various methods available to predict the stock market trends based on an artificial neural network with enormous datasets to increase the precision and accuracy of predicted stocks. Our main hypothesis states that the performance of ANN algorithm is better than the other methods.

## **Literature Review:**

A considerable amount of literature has been published on stock prediction using ANN in

which emerging market is targeted. However, we have presented a very concise survey for some of the noteworthy researchers who contributed to the prediction of stock prices using ANN with different algorithms. The study compromises with different inputs, indicators, data frequency on daily basis, made the systematic review and compared various algorithms. In Table 1 the highly comprehensive perspective is provided which includes algorithm, Stock Market, Country, Data Set and indicators Evaluation Method and Results with references.

The Abbreviations and their meaniare is mentioned in Table 2, Table 3, Table 4, Table 5, Table 6 stock exchange, stock Index, Algorithms, Evaluation Matrix, Indicators respectively.

**Table 1:** Comprehensive Study

Algorithm(s)	Stock Exchange	Dataset Period	Data and Indicators	Evaluation Method	Results	Ref. No.
STE- NN	SAI, SBI,HSI ,DJIA , IXIC , S&P(500)	1990-2008	Time Series Data	ARE	Correlation between China Stock and Foreign Stock Exchange	7
SVM, BH	S&P (500)	2004-2008	MA, RSI, ROC, Fast K, Slow K, Slow, Close	AR, SCC, MSE	Performance : SVM is better than BH	8
3 Linear Model, ANN	SSE,SZ SE	1 Jan 1999-31 Dec 2008	Close , Quarterly Book Value, Common Shares Outstanding	MAPE,MA D,MSE	Performance : ANN is better than linear Model	9
GPOMS	DJIA	28 Feb 2008 - 19 Dec 2008	Time Series Data	MAPE	Accuracy - 87.6%	10
ANN-MLP, D-ANN, H-NN	NASDAQ	7 Oct 2008 - 26 Dec 2009	Time Series Data	MSE, MAD	Performance : ANN-MLP is better to other models.	11
BPN & SVM	ISE 100	2 Jan 1997 - 31Dec 1997	SMA10, WMA10, Momentum, K%, D%, RSI, MACD, R, A/D, CCI	t-test	Predictions : ANN: 75.74 Polynomial SVM: 71.52	12
ANFIS, Firefly - SVR, GA - SVR ,	NASDAQ	9 Dec 2007 - 11No 2011	Time Series Data	MSE,MAPE	Performance : SVR-CFA better to all Models	13

C- GA - SVR		9 Dec 2007 - 11Nov 2010 27 Jun 2008 - 29 Aug 2011 (MS, Intel, National Bank)				
SVM ,BP	NSE	1 Jan 2007 to 31 Dec 2010	Time Series Data	NMSE, MAE,DS	Performance : SVM is better to BP	14
DT	NASDAQ	1 April 2011 - 31 May 2011	Twitter Data	PF, NF, Accuracy	Accuracy: 82.93%(Apple), 80.49%(Google), 75.61%(MS), 75.00%(Amazon) .	15
ANN-EPCNN, LRM	1(stock) ∈ TSE TSE(ind ex)	3 March 2003 to 4 Jan 2006	MA, BIAS, RSI, MACD, %R, K-D, diff. between tech. indicator t - t1	MAPE	Expressive Ability: EPCNN is better to BP	16
Bayesian ANN, ARIMA	2-Stocks	4 Jan 2010 - 31 Dec 2012	Time Series Data , EMA, RSI , R%, %K, %D	MAPE	Performance : ANN is better to ARIMA	17
ANN and Multiple RA	TOPIX	Jan 1985 - Sep 1989	Vector curve, Turnover, Interest rate, New York Dow-Jones average, Foreign exc. , Technical Indicator	CC	Conclusion: Algorithm results are accurate.	18
BP-NN, SVM,ELM, K-ELM and MKL-ELM	HKEX	2001	Time Series Data , Market News	A, Deviation, Accuracy	Accuracy : 1) MKLELM, K-ELM & SVM better to BP-NN, B-ELM; 2) MKL-ELM	19

					& K-ELM are faster to SVM 3) MKL-ELM is better to K-ELM	
ANN-SVR, SVR-RF, SVR-SVR	BSE, CNX	Jan 2003 to Dec 2012	10 Indicators - Time Series Data	MAPE, MAE, RMSE, MSE	Performance : SVR Fusion better to ANN	20
ELM, DE, OELM, DE, SAD HS, SAD HS SVM, BP-NN	BSE, CNX, Nikkei, FTSE	4 Jan 2010 - 30 Apr 2013 & 4 Jan 2010 - 4 Jan 2013	Time Series Data	A, Volatility Prediction	Performance : CEFLANN better to all learning schemes including the RBF model.	21
RBF ELM, RBF, SVM, BP-NN	HSI	2001	MN, Time Series Data, RSI, RSV, R, BAIS, PSY, Psychological Line	A, Deviation	Performance : Accurate signal will generate more profit with less risk	22
ARIMA	NSE, NYSE	25 April 1995 - 25 Feb 2011	Time Series Data	t-statistics, Std. Error, Coefficient	Performance : ANN is better to ARIMA	23
Fuzzy time series models, 3 SVM models, and 3 modern economic models - GARCH, GJR-GARCH, and Fuzzy GARCH.	TAIEX, DJIA, S&P (500), IBOVE SPA Index	1997-2003	Time Series Data	t-test, MSE, RMSE, MAE, MPE, MGN	Inferences: The experimental result provides improvement for optimized linguistic intervals & ensuring the accuracy of the proposed model	24
ANN, SVM, Random Forest,	S&P(500), CNX, BSE	2003-2012	Time Series Data	F-measure, Accuracy, Precision, Recall	Performance : Random forest outperforms depend on	25

Naïve Bayes					technical parameter. The technical parameters are represented as trend then all prediction will increase.	
SVM ,BP	NSE,S&P(500)	1 Jan 2007 - 31 Dec 2010	Time Series Data ,Fundament Analysis	MAP, NMSE,DS	SVM is Better than BP	26
K-ELM with NRDC and N ,TFIDF,N -N-K ELM, SVM and BP	HIS	2001,	NEWS, Time Series, RDP,RSI,R,BIAS ,PSY	A, Deviation	Performance : N-N-K-ELM accuracy is better to other models	27
ABS, JST Method, LDA, SC, HS	18 Stocks from Yahoo Message Board	23 July 2012 - 19 July 2013	Closing Price	Accuracy	Accuracy: 60%.	28
MKL, SVM, kNN	S&P(500)(16 Stocks)	1 Sep 2009 - 1 Sep 2014	LexisNexis Database	Accuracy ,Return	Performance : News alerts improves the performance of prediction.	29
FLANN, MLANN ,RBFNN and SVM	DJIA,S &P(500)	Jan 2000 - Oct 2012	SMA, EMA, ADO, STOC, RSI, PROC, CPACC,HPACC	MAPE	Performance : Proposed model better to MLANN, RBFNN and SVM based prediction models	30
HS & GA based ANN	BIST 100	8 June 2005 - 20 Sep 2013	Momentum, Acceleration, close, Previous, SMA,EMA, Triangular MA,	MAPE,RM SE,MSPE,R MSRE,MA E.,MSE,MA RE,RMSPE	Comparison: HS-ANN perform Better based on four	31

			A/D , Close, MACD, Chaiking volatility, Fast & Slow %D, Fast & slow %K, %R, RSI, BB, High, Low, MP, TP, WC, WAD		points - loss functions, return from investment, buy and Hold graphical Analysis, according to statistics.	
Fuzzy Model	ASE	15 Nov 1996 to 5 June 2012	Parabolic SAR ,GANN-Hi, Lo, MACD, MA, Close Price	Accuracy	Accuracy: Fuzzy Model for B&H gives better forecast accuracy.	32
CEFLANN with ELM, SVM, Naïve Bayesian model, KNN and DT	BSE & S&P(500)	5 Years	MA, MACD, Stochastic KD, RSI, Larry William R,	Accuracy	Performance : CEFLANN generate best result compare to others	33
Hybrid Model-LC,RC,R R,RF with PSVM	12(index)	2008-2013	Time Series Data	A	Performance : All proposed model are better to PSVM	34
GARCH, ANN	Chinese energy index(index)	31 /12/ 2013 to 10 /03/2016	Time Series Data	RMSE	Performance : GARCH ANN is better than other models to forecast the volatilities of log-returns.	35
ANN, SVM, ANFIS	BIST 100	2007 to 2014	Closing Turkish Lira & Closing US Dollar, Closing of Euro, Closing Price of Gold, Closing Price of ISBT	Accuracy , Sensitivity, Specificity	Parameters : Six parameter model gives better result compared to peer counterpart	36

					which has taken more than 10 input variable	
AR,ANN, PCA	38(stock) ∈ KOSPI	4 Jan 2010 to 30 Dec 2014 (5-min)	Time Series Data	NMSE,RMSE,	Performance : Deep Learning Method gives better performance compared to others.	37
ANN,DT, RF	S&P500 (stock)	1990 to 2015(d)	Time Series Data	AR,ER,SR, MD, Sort R,*	Strategy: Arti-Bag Prediction	38
SVM, ANN, kNN, BH	50(stock) ∈ S&P 500	29 Jan 2002 to 29 Dec 2012(d)	Time Series Data, SMA, EMA, ATR, ADMI, CCI, ROC, RSI, William R, Stochastic %K,%D	A,SR,WR	Performance : Depends on a combination of a forecast horizon and an input window length for forecasting variable horizons.	39
Expert System, Simple ML - SVM,ANN,DT	NASDAQ	1 May 2012 to 1 June 2015	Time Series Data, CS ,EI, %K, %R,RSI	Accuracy	Accuracy : 85 % (Apple)	40
LSTM, Regression	NSE	9 Lakh Records	Open ,High, Low, Close, Volume	R-Test, MSE,RMSE	Performance : LSTM better to Regression	41
ARIMA, ANN, SVR,BP	5(stock) ∈ BOVESPA		Time series Data	ARV,MAP E, MSE, POCID,	Cost Effective : The Proposed model is better to BP	42
ANN,RF, ANN,LR M	S&P500 (stock)	Jan 1990 - Oct 2015	Time series Data	AR, SR, Sort R,MD,*	Performance : LSTM better to RAF, DNN,LOG	43

ANNC,ANN,ANN,BH,SMART	Dow30(stock),9ETF(ETF)	1/1/2002 to 1/1/2017	RSI, Williams %R, WMA,EMA, SMA, HMA, Triple EMA, CCI, CMO, MACD, PPO, ROC, CMFI,DMI, and PSI, Time Series Data	AR, std	Hit Ratio : The proposed model is used to entry and exit.	44
ANN,SVM	S&P500 (index)	1991-2017(d)	Time Series Data	A,AR	Performance : GRU better to SVM	45
ANN,SVR,SVM	NSE	30 Nov 2017 - 11 July 2018	Time Series Data	MAPE,MSE	Performance : RNN is better to ANN	46
Mean, High low Difference	S&P 500 , Nasdaq	Jan 1995 - Jan 2020	Time Series Data	SEQ, GEN,CHI,REF,CC,IG,RV,PCA	Classification Accuracy : increased by 25%.	47

Table 2: Stock Market

Abbreviation	Stock Exchange	Abbreviation	Stock Exchange	Abbreviation	Stock Exchange
ASE	Athens	HKEX	Hong Kong	SPSE	South Pacific
BEL	Belgium	ISE	Istanbul	SSE	Singapore
BIST	Borsa Istanbul	Nikkei	Tokyo	SZSE	Shenzhen
Bovespa	Soa Paulo	NSE	National	TAIEX	Taiwan
BSE	Bombay	PSE	Poland	TOPIX	Tokyo
CSE	Cyprus	NYSE	New York		

Table 3: Stock Index

Abbreviation	Meaning	Abbreviation	Meaning
KOSPI	Korea Composite Stock Price Index	MM	Market Maker
MSCI	Taiwan Future	NASDAQ	National Association of Securities Dealers automated Quotations.
CNX	Credit Rating Information Service India	DAX	Deutscher Aktien index
DJIA	Dow Jones Industrial Average	FTAI	Fortress Transportation and Infrastructure Investor
FTSE	Financial Times	FX	Foreign Exchange
HIS	Hang Seng Index	IGBM	Madrid Stock Exchange General index
S&P	Standard and Poor's 500 Index	TSEC	Taiwan Capitalization Weighted



Table 5: Algorithm

<b>Abbreviation</b>	<b>Algorithm</b>	<b>Abbreviation</b>	<b>Algorithm</b>
AES	Adaptive Exponential Smoothing	LDA	Linear Discriminate Analysis
ANFIS	Adaptive Network-based Fuzzy Inference System	LR	Linear Regression
ANN	Artificial Neural Network	LRM	Linear Model
AP	Asymmetric Power	LSTM	Long Short Term Memory
AR	Auto Regressive	MKL-ELM	Multi Kernel Learning based Extreme Learning Machine
ARIMA	Auto Regressive Integrated Moving Average	ML	Machine Learning
BH	Buy and Hold	MLP	Multi-Layer Perception
BP	Back Propagation	NFUZZ	Neuro-Fuzzy
CBR	Case Based Reasoning	NN	Neural Network
CEFLANN	Chebyshev Functional Link Artificial Neural N/W	OELM	Optimized Extreme Learning machine
DT	Decision Tree	P	Probabilistic Particle Swan
EFNN	Evolving Fuzzy Neural Network	PNN	Optimization Neural Network
ELM	Extreme Learning Machine	RBF	Radial Basis Function
FDT	Fuzzy Decision Tree	RF	Random Forest
FLANN	Functional Line ANN	RW	Random Walk
GA	Genetic Algorithm	SADHS	Self-Adaptive Differential Harmony Search Based
GARCH	General Autoregressive Conditional Heteroskedasticity	STE	Stochastic Time Effective
GFNN	Genetic algorithm (Fuzzy Neural Network)	SVM	Support Vector Machine
GPOMS	Google Profile of Mood State	SVR	Support Vector Regression
HBS	Human based Sentiments	HS	Human Sentiment
HE	Hybrid Elman	TAR	Threshold Autoregressive
HNN	Hybrid Neural Network	ABS	Aspect Based Sentiment,
HS	Harmony Search	UI	User Interface
Hybrid NN	Hybrid Neural Network	VEC	Vector Error Correction
K-ELM	kernel based Extreme Learning Machine	PSVM	Proximal Support Vector Machine
RC	Rank Correlation	DNN	Dynamic Neural Network
RR	Regression Relief	LC	Linear Correlation
SC	Sentiment Classificaiton		

Table 5: Evaluation matrix

<b>Abbreviat ion</b>	<b>Meaning</b>	<b>Abbreviat ion</b>	<b>Meaning</b>
A	Adaptive Parameters	MAP	Maximum a posteriori probability
AR	Autoregressive	MAPE	Mean Absolute Percentage Error
ARR	Accounting Rate of Return	MARE	Mean Absolute Relative Error
BETA	Indicator for Risk Analysis	MM	Moving Mean
CC	Coefficient Correlations	MPE	Mean Percentage Error
CD	Confidence Distribution	MSE	Mean Square Error
CP	Ratio of specification to process spread	MSPE	Mean Square Prediction Error
DA	Discriminant Analysis	PF	Positive Feed %
DS	Descriptive Statistics	RMSE	Root Mean Square Error
HT	Hit Rate	RMSPE	Root Mean Squared Prediction Error
MAD	Mean Absolute Deviate	SR	Statistical Reliability
MAE	Mean Absolute Error	Std	Standard Deviation
PF	Positive Feed	NF	Negative Feed

**Table 6 :** Indicators

<b>Abbreviation</b>	<b>Meaning</b>	<b>Abbreviation</b>	<b>Meaning</b>
Time Series	Open, High, Low, Close, Volume	*Momentum	Open, High, Low, Close
CPACC	Closing Price Acceleration	HPACC	High price acceleration
*Acceleration	Low, High, Close, open	*Previous	Close, High, low, Open
WAD	William Accumulation Distribution	A/D	Accumulation Distribution Oscillator
RSI	Relative Strength Index	EMA	Exponential Moving Average
%K	Stochastic %K	%R	Larry William %R
BB	Bollinger Band	ROC	Rate of Change
MN	Market News	ADMA	Average Directional Moving Average
%D	Stochastic %D	CSO	Common Shares Outstanding
CS	Crowd Source	DMI	Directional Movement Indicator
EC	Economic Indicator	MA	Moving Average
MP	Median Price	PSAR	Probabilistic SAR
PROC	Prince Rate of Change Indicator	T	Turnover
TPWMA	Typical Price Weighted Moving Average	TP	Typical Price
WC	Weighted Close		

Some studies have shown the beneficial effect of ANN with respect to linear models but others have shown a deterioration in results. In this literature survey, the ANN with specific indicators

works fine with individual stock exchanges. It is not applicable for generic purposes. The majority of the considered stock exchange is stable. The investigated time series data is collected on basis of daily frequency. The performances are based on statistical and non-statistical methods.

## 2. RESEARCH METHOD

**Meta-Analysis:** Meta-Analysis is required when multiple scientific studies address the same question, with each study reporting some degree of error. It faces challenges when there is no subgrouping. The studied algorithms are in heterogeneous nature. Subgrouping of heterogeneous algorithms is difficult. To overcome the issue peer grouping is formed based on geographical location and analysis the result.

**Meta-Statistics:** There are 45 papers in the dataset form IEEE transaction, IEEE **Xplore**, Elsevier, ACM and etc., The filter is applied based on algorithm category, results and peer-reviewed journals.

**Dataset:** All samples are carefully checked for investigation. The assets in the data set represent stock and index. The papers we considered for the survey are based on stock Exchange their distribution is United state America (18), India(5), Chine(8), Hong Kong(3), Turkey(3), Taiwan(3), Japan(2) and Brazil, Germany, Korea, Portugal and other having one each.

## 3. RESULTS AND DISCUSSION

Performance analysis of each forecasting model is done through a different measure of speed, and feasibility, and their accuracy is evaluated and compared. Performance measures are classified as statistical measures and non-statistical measures. Statistical measures are shown in Table. 5. Non-statistical measures include Performance measures, Cost-effectiveness, Strategy and hit ratio.

## 4. CONCLUSION

The process of computing the future stock value of the company or other financial instruments is known as stock market prediction. Successful prediction leads to significant profit. From this survey, the following concluding remarks can be made. i. Various algorithms of machine learning and Artificial intelligence have been compared and widely accepted algorithm is ANN. ii. The result of an algorithm depends on the different indicators and it works accordingly. iii. ANN algorithm gives good results compared to other algorithms. iv. The available studies in these areas are based on technical and fundamental analysis. v. Most of the researchers selected the stable stock market for their studies. vi. It is possible to produce a new cross or combination of various methods to forecast the upcoming stock price movement. vii. Studies found that macroeconomics and company-specific data play a vital role for prediction. viii. The Performance of prediction depends on the algorithm and stock markets.

This study is useful for researchers those who are working, studying, estimating and predicting on stock market price movement behavior.

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## Trends in Indian IPO Market

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### **Abstract:**

*Initial public offerings represent a turning point in the evolution of an entrepreneurial firm and play a pivotal role in its survival and growth. Besides contributing to company's coffers, they provide liquidity for its shares and generate tremendous wealth for the investors, amongst other obvious benefits. Indian IPO Market has drawn considerable interest from academicians and researchers for its uniqueness in terms of trends, policy and structural and reforms. It has experienced boom and cold periods ever since its deregulation, way back in 1992, carrying through the onslaught of Covid-19. The pandemic of Covid-19, which caused a dramatic loss of human life worldwide and posed unparalleled challenge to public health, food system and employment, severely impacted the global financial markets. Since Indian IPO Market has displayed varied nuances over the last more than three decades, it becomes desirable to dig deep into trends which it has gone through in an era of deregulation and liberalization in Indian financial system.*

**Keywords:** IPO, Deregulation, Trends, SEBI

### **Introduction:**

One of the most pronounced events, arguably, in the life of any Corporations is its transition from a private to public Company via Initial Public Offering (IPO) process (Dunbar & Foerster, 2008). Many private companies aspire to make their debut in capital market, as they tread along their journey. It is an achievement for the founder (s) and bears a testimony to their founding vision, strategic direction, and managerial skills in actualizing their firm from the concept stage to being a public company (Jain & Tabak, 2008). Besides contributing to company's coffers initial public offering provides liquidity for its shares and generates tremendous wealth for the investors. The other obvious benefits of going public include improved credibility, creating more leverage for financing growth and the like.

Indian IPO Market has come a long way since its deregulation in 1992. Having displayed conspicuousness in terms of trends, pricing regimes, policy and structural reforms, it has drawn considerable interest from academicians and researchers. Post liberalization, the office of Controller of Capital Issues (CCI) was abolished, which administered the Capital Issues(Control) Act, 1947. Subsequently, Securities and Exchange Board of India was established as a market regulator in 1992. Thereupon, started the new journey of Indian IPO Market, inundated with ups and downs.

### **Design of The Study:**

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The present paper, based on secondary sources of data, peruses the journey of IPO Market in India in the last three decades. It proceeds with following specific objectives:

1. To analyse the trends in terms of number of IPO issues listed and the funds garnered through them, for the period 1992-93 till 2021-22.
2. To investigate the factors causing the trends so examined.

## **Section Two: Analysis of IPO Trends in India**

The Government of India's New Economic Policy of 1991 was a watershed moment in the history of Indian economy. It brought along an era, inundated with a plethora of reforms, be it fiscal, monetary, exchange rate or trade related reforms. There were Capital Markets Reforms as well, poised for providing adequate investor service and protection, other than ensuring disclosure and transparency on part of all market players (SEBI Annual Report, 1992-93).

The abrogation of the Capital Issues (Control) Act of 1947, on May 13, 1992, paved the way for liberalisation in Indian Capital Markets. This act was administered by the Controller of Capital Issues (CCI) in the Ministry of Finance, Department of Economic Affairs, Government of India. The companies were mandated to seek prior approval of CCI for raising funds from the public. The timing, quantum and pricing of issues were all decided by CCI. Therefore, with its abolition, all kinds of controls over pricing and timing were done away with as well.

With the abolition of Office of Controller of Capital Issues, SEBI was established as a statutory market regulator in 1992, though it was constituted as a non-statutory body in the year 1988. Until then, the companies who wished to come up with their issues had to price their offerings as per the formula given by CCI. The CCI regulations would set a maximum allowable premium which an issuing company would charge, as a result of which the securities were underpriced, generating tremendous returns for investors but raising the cost to the issuers (Jaitly & Sharma, 2004).

With the advent of SEBI, ushered in an era of free pricing, which was denied earlier under CCI regime. As a result, a spurt was witnessed in both number of issues and amount garnered through them from 1992-93 till 1995-96, as revealed by Table 1 which showcases trends in Indian IPO market. So period from financial year 1992-93 till 1995-96 was a boom period in initial few years of liberalization and it is also evidenced from the positive percentage change in number of IPOs listed and the funds raised through them, by and large.

Post this spurt a dramatic slowdown was witnessed from 1997-98 to 1998-99 because of factors like decline in industrial activity and strict point norms as laid down by SEBI. However, things improved the following financial year, i.e., 1999-00 given the worldwide trends of information technology and healthcare firms. This euphoria surrounding information technology persisted till 2000-01, after which it was again back to lull, and the worst performing years followed, i.e., 2001-02 and 2002-03, when only 7 and 6 issues hit the market, respectively.

### **Trends in Indian IPO Market**

The IPO market started to gather strength in 2003-04 and 2005-06, thanks to the robust macroeconomic fundamentals, steady growth in manufacturing sector, positive investment



climate, good corporate results, all these factors prompted companies to raise resources from the market (SEBI Annual Report, 2005-06). The momentum so gathered lasted till the financial year of 2007-08. The US Sub-prime crisis induced recession in 2008 had its adverse impact on Indian primary market as well, when only Rs.2082 Crore could be garnered through 21 issues in the financial year 2008-09. The comeback, witnessed in 2010, was dominated by Disinvestment Programme of Public Sector Enterprises by Government of India, with Coal India Ltd being the biggest IPO in the history of Indian Capital Market until then, having mopped up Rs. 15200 Crores in October 2010. The year 2010-11 ended on a good note, with 53 issues having mobilized Rs. 35559 Crores.

**Table 1: Trends in Indian IPO market**

<b>FY</b>	<b>Number of IPOs</b>	<b>%change in Number of IPOs</b>	<b>Amount of IPOs (Rs. Crores)</b>	<b>%change in Amount of IPOs</b>
1992-93	467	-	3673	-
1993-94	692	48.71	7864	114.10
1994-95	1239	79.04	16572	110.73
1995-96	1357	9.52	10924.11	-34.08
1996-97	717	-47.16	5959	-45.45
1997-98	52	-92.75	1048	-82.41
1998-99	18	-65.38	404	-61.45
1999-00	51	183.33	2719	573.02
2000-01	114	123.53	2722	0.11
2001-02	7	-93.86	1202	-55.84
2002-03	6	-14.29	1039	-13.56
2003-04	21	250	3434	230.51
2004-05	23	9.52	13749	300.38
2005-06	79	243.48	10936	-20.46
2006-07	77	-2.53	28504	160.643
2007-08	85	10.39	42595	49.44
2008-09	21	-75.29	2082	-95.11
2009-10	39	85.71	24696	1086.17
2010-11	53	35.90	35559	43.99
2011-12	34	-35.85	5,904	-83.40
2012-13	33	-2.94	6528	10.57
2013-14	38	15.15	1236	-81.07
2014-15	46	21.05	3039	145.87
2015-16	74	60.87	14815	387.50
2016-17	106	43.24	29,105	96.46
2017-18	199	87.74	83775	187.84
2018-19	123	-38.19	16087	-80.80

2019-20	60	-51.22	21345.11	32.69
2020-21	55	-8.33	31029.71	45.37
2021-22	120	118.18	112552	262.73

**Source:** Various Annual Reports of SEBI.

The market showed signs of growth, especially in mobilization of funds in the FY 2015-16, as vindicated by the percentage change of 60.87% and 387.50% for number of issues and funds raised, respectively. It did well in the following financial year also and Rs. 29105 Crore were raised via 106 issues in 2016-17. This was reinforced by strong macroeconomic performance, easing inflationary pressures, stable FDI inflows and regulatory reforms brought by Government of India (SEBI Annual Report, 2016-17). The performance further invigorated in 2017-18, with 199 issues raising Rs. 83775 Crore. The highlight of the year were big-ticket issues by General Insurance Corporation of India, The New India Assurance, HDFC Standard Life, SBI Life, Reliance Nippon, AU Small Finance, Cochin Shipyard, Avenue Supermarkets, HUDCO, Godrej Agrovvet and India Energy Exchange, all of which together raised between Rs. 1000 to Rs. 11000 Crore, even though most of them failed to outperform the market subsequently (Anand, 2017).

The financial year 2018-19 saw a huge slump on the pretext of market volatility, rapidly increasing trade war fears, liquidity crisis at NBFCs and a weaker Indian rupee (SEBI Annual Report, 2018-19). The funds mobilized were Rs. 16087 Crore via issuance of 123 IPOs. The number of IPOs listed decreased even further in 2019-20 to 60 issues, however, the funds mobilized were Rs. 21345.11, which were more than that for the previous FY, i.e., 2018-19. The number of IPO listings decreased further in 2020-21 to 55, but again the fund mobilization was greater than the previous year, at Rs. 31029.71 Crore.

Despite the Covid-19's ubiquitous disastrous impact, Indian IPOs had a fantastic year in 2021-22, thus escaping the scathing impact of the pandemic. The highlight was the largest IPO ever in the history of Indian IPO Market, i.e., Paytm, which mobilized Rs. 18300 Crore, thus surpassing Coal India's figure. Next in line of big issues were Zomato (Rs. 9375 Crore), Star Health (Rs.6019 Crore), PB Fintech, i.e., Policy Bazaar (Rs. 5710 Crore), Sona BLW (Rs. 5550 Crore) and Nykaa (Rs. 5350 Crore). Surprisingly, fundraising has been the highest ever for the financial 2021-22, with 120 issues having garnered Rs. 112552 Crore. As a matter of fact, the funds mobilized were greater than any other year in the last more than ten years, and that too by wide margin. By far this has been an unprecedented year in terms of funds raised by many new age companies, tech startups and unicorns. According to analysts, this stupendous performance is due to investor's confidence in markets and good corporate performance (Rukhaiyar, 2022).

## Section Two: Findings and Conclusions

Initial Public Offerings play a very important role in survival and growth of an economy. Besides contributing to company's coffers, they provide liquidity for its shares and generate tremendous wealth for the investors, amongst other obvious benefits. IPOs and their associated aspects happen to be amongst the most researched areas in finance. Indian IPO market has had an eventful journey since its deregulation. This journey has been inundated with ups and downs. It hit a purple patch in initial years of liberalization and experienced a boom in terms

of both number of issues and funds raised. Thereafter, after seeing through slow down it witnessed another boom, this time

### Trends in Indian IPO Market

In the name of Information Technology, which happened to be worldwide phenomenon. It had a fantastic year in 2010, thanks to the Disinvestment Programme of Government of India. Post another slump, the market showed signs of resilience, when in 2017-18, many big-ticket issues by insurance companies hit the market. The most pleasant surprise unfolded in FY 2021-22, when the biggest ever IPO in India, i.e., Paytm raised Rs. 18300 Crore, despite scenario inundated with after effects of pandemic Covid-19. In fact, this year turned out to be an unparalleled example of resilience, when maximum funds were raised by many new age companies, tech startups and unicorns.

The long and short of it is that IPOs can fuel growth and widen investment opportunities, especially in this age of startups and innovative companies in an emerging economy of India. The need is to sustain the positive investment climate and investor's confidence in markets, and for this concerted efforts are required from issuers, regulatory bodies and the government.

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# An analysis of the motivations behind passive investments: A Study

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## ***Abstract***

*This study looks at how index funds perform when paired with exchange-traded funds (ETFs), which are cutting-edge financial engineering products that are appealing to today's investors who prefer passive investment strategies because they have limited time and demand a higher return, liquidity, and ease of trading along with a minimum risk of tracking errors and other incidental costs and fewer tax repercussions when purchasing stock market instruments.*

**Key Words:** Index Funds, Exchange Traded Funds, Cash Drag, Risk, Return.

## A study on the status of IFRS adoption in south Asian countries

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### **Abstract**

*Accounting is considered as the language of business and in this era of globalization, the language needs to be common for all. This gives the need for having a common set of accounting rules and regulations all around the world. In this particular context, international reporting standards become prominent. These are the common set of policies, practices, rules, regulations etc. to be followed while preparing your financial statements. The technology driven world is becoming a single global village, hence it becomes necessary for the entire global village to have a common format to be followed in all accounting aspects. Having a common set of formats for accounting, facilitates comparisons easily. Convergence or adoption of the international standards enhances the credibility of the country as the disclosure requirements as per IFRS is quite high. In this paper an attempt is made to understand the extent to which South Asian countries are in adoption or convergence of the international reporting standards and the role of regulatory bodies of each country. The data has been collected from the secondary sources and review of literature. The study concludes that the overall level of adoption is different for different countries in South Asia. Afghanistan, Bangladesh, Bhutan, Maldives and Pakistan have officially decided to go for adoption whereas, India, Sri Lanka and Nepal with convergence and these nations are confronting number of issues that ought to be settled for way better merging of IFRS.*

### **Key words**

**IFRS, Regulatory frame work, convergence, adoption, accounting quality**

# Determinants of Dividend Policy: An Empirical Analysis in the Context of India

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## **Abstract:**

*In this paper dividend pay-out policy of non-financial listed firms in the context India is studied. India is the second largest emerging economy. This study is carried out on a large dataset consisting of 1134 forms over a 20 period. As a result, findings from this study should be robust. Based on literature eight factors are considered as determinants of dividend policy. Panel fixed effect model is found to be appropriate for the study. The results of the study show that, net profit, firm size, firm growth, free cash flow, return on asset have positive influence on dividend pay-out of a firm, whereas firm liquidity, leverage and market risk has negative influence on it. In the post crisis period magnitude of negative impact of firm leverage on firm dividend pay-out is substantially high.*

**Keywords: Dividend Policy, Firm Size, Leverage**

## **1. Introduction**

A "dividend" is the portion of a company's profit (after taxes) returned to its equity capital providers. In other terms, a dividend is the portion of a firm's net income that is distributed to its shareholders. It is a benefit granted to shareholders of a company. As compensation for their investment in the business, equity stockholders receive dividends. The right of equity shareholders to receive tips from a company's profits is important (Booth & Zhou, 2017).

The company's board of directors establish the Dividend Policy (DP), which is a framework for distributing dividends. The policy specifies how profits should be distributed to shareholders. It also specifies the frequency and method of dividend distribution. The method by which a corporation determines whether or not to pay dividends to its shareholders is known as its DP. DP is a financial decision that determines the amount and frequency of dividend payments and whether dividends should be paid at all. It is determined by the company's board of directors and specifies how dividends are distributed to shareholders (Scripbox, 2022).

The net profits of a firm are divided between retained profits and dividends as a result of its dividend policy. The retained earnings fund the company's future expansion. In fact, it is the most crucial source of investment capital for a business. Cash dividends are distributed. As a result, the corporation pays out earnings using cash on hand. If a firm wishes to pay dividends and also invests, it may have to rely on external funding sources, such as the sale of debt or shares (Omar & Echchabi, 2019). Therefore, the company's dividend plan impacts both its long-term finances and the value of its shares.

When managing money, DP is one of the three most significant factors to consider. The DP determines how much of a company's income should be distributed as dividends and how much should be reinvested to build the business (Pandey & Ashvini, 2016).

Management determines the amount and frequency of share repurchases over time. The primary focus of a company's dividend policy is the proportion of profits to be distributed as dividends. The return The payout ratio of a firm is the proportion of profits given to shareholders in cash (Investortonight, 2021). A company's management must decide on a dividend because he or she must choose how much profit will go to shareholders and how much will remain in the company. The number of dividends and earnings retained by the corporation are related. The payout ratio influences the value of shares on the market.

When making a choice, the management considers how it will affect shareholder wealth. The plan for distributing a portion of a company's profits to its owners or stockholders is known as its dividend policy. If a company is expanding, it may elect not to pay dividends and instead reinvest its revenues in the company. This is referred to as retained earnings. If a firm wants to pay dividends, it must determine the frequency and amount of dividend payments (Investortonight, 2021). Large, well-known corporations pay dividends regularly, but they may also declare "special dividends" occasionally. Dividend payments alter how the financial markets see a firm and can immediately impact its stock price. A business must make decisions on investments, finances, and dividends, all of which are crucial. The dividend decision is the most crucial of all of these.

The constant dividend policy stipulates that a corporation must distribute a fixed percentage of its annual income as dividends. Thus, investors are exposed to the full spectrum of earnings fluctuations. Suppose profits increase and the payout increases. If profits decline, investors may not get a dividend (Baker & Kapoor, 2015).

In order to maximise shareholder value, management should devise a dividend policy that allocates net earnings between payouts and retained earnings (Shafai et al., 2019). The company's investment options and the relative worth of dividends and capital gains for shareholders will significantly impact the formulation of this policy. Cash dividends reduce a company's ability to invest in profitable possibilities. This either delays the company's growth or pushes it to seek out more costly means of generating revenue (Shafai et al. 2019). However, investors that pay a substantial amount of taxes may favour capital gains over dividends. If firms choose to retain their gains rather than distribute them to others, their wealth will increase.

The firm management must determine the amount, timing, and other criteria affecting dividends (Alzomaia & Al-Khadhiri, 2013). There are three distinct types of dividend policies: constant, stable, and residual.

### 1.1 Factors Affecting Dividend Policy

Debentures, preference shares, and equity shares are various methods by which a firm might acquire more funds. The holders of preferred shares and debentures receive a predetermined rate of interest. Investors are not required to receive a return on their investment. If there is a loss, they will receive no compensation. If the business is profitable, it must decide whether to issue dividends. (Kamierska-Jówiak, 2015) The dividend amount must be determined if it is to be paid. The corporation will determine its dividend to maximise profits for its stockholders. There are various types of dividend policies, including regular, consistent, stable, and irregular. The following factors influence firm dividend policy.

A company's dividend policy is affected by its ownership structure. A corporation with a greater proportion of promoter ownership will seek to pay a lesser dividend because it could reduce the stock's value (Khalid & Rehman, 2015). Similarly, the company's various

shareholders kinds also influence the policy. Different stockholders would have different objectives. To develop a successful dividend plan, the business must thoroughly understand the various expectations. According to psychology studies (Kamierska-Jówiak, 2015), a cash dividend will make shareholders happy than capital growth. On the other hand, a firm with a high level of leverage in its financial structure and, as a result, greater interest payments may choose to pay out a low dividend in order to raise its net worth and ensure that it can continue to pay its obligations even if its earnings decline. A firm may distribute dividends in the form of cash or bonus stock. However, these income sources are taxed differently. Capital gains are a source of income that is treated more favourably than cash dividends (Dewasiri et al. 2019).

A firm need money for the purpose of future investment. The dividend size will also rely on how much additional cash will be required in the future. When there are lucrative investment prospects, a business might retain its profits. However, a company that doesn't require cash should choose a larger dividend (Khalid & Rehman, 2015). When a business is doing well, preserving money and building up reserves for lean times is prudent. With these reserves, a company can continue to pay dividends even when the market is poor, making it more attractive to investors.

The net profit and profit-to-total-assets ratios reveal a company's profitability (Khalid & Rehman, 2015). A company with a high-profit margin can pay out more dividends, whereas a company with a lower profit margin will be more conservative. Also, corporate taxes may have a direct or indirect impact on the dividend policy, as taxes directly impact the residual earnings of investors.

Trends of profit also influences dividend policy. Even though a firm has continuously produced a profit over the years, the trend should be carefully analysed to determine the company's average profit. The next stage is to examine the entire economy in light of this average number (Yusof & Ismail, 2016). This will assist you in selecting a prudent line of action if you believe depression is imminent.

When a business earns a lot of money, the majority of it is often invested in working capital or utilised to purchase assets. If so, it lacks sufficient funds (Yusof & Ismail, 2016). The corporation should then reduce its dividend payments. Typically, a long-standing company has a substantial amount of capital on hand and may pay out substantial dividends. However, a developing business must address the issue of money (Jaara et al. 2018). Therefore, even though it earns a lot of money, the management may not be able to pay dividends due to a lack of capital.

When there is inflation, corporations must retain a large portion of their earnings and pay out fewer dividends. When prices rise, companies must increase their capital reserves in order to acquire fixed assets. The value of a specific amount of stock at the end of the year increases when there is inflation. Consequently, the tax due likewise increases (Yusof & Ismail, 2016).

From a firm management perspective two important factors are financial needs of the company and access to capital market.

The dividend policy determines what percentage of a company's income will be distributed to shareholders and what percentage will be retained. Consequently, the management's decision to distribute a portion of profits to shareholders is known as the dividend policy. The company's dividend policy should be determined by the amount of money it will need to invest in the future. Companies that wish to expand typically require constant capital and seek to retain earnings (Gangil & Nathani, 2018). Retention of earnings is easier to employ and less expensive than a new issue because there are no flotation expenses. However, if the company has little or no growth prospects, it will likely choose to pay dividends rather than retain the



cash. A company's dividend policy is determined by the amount of cash on hand, the ease with which it may obtain funds from the market, and the cost of doing so. It may not be difficult for a reputable, well-known company to obtain capital on the stock market. Since the stock market can cover the financial needs of these corporations, if necessary, they can issue dividends (Jaara et al. 2018). However, a developing firm with limited access to the capital market will be unable to pay frequent dividends since it cannot rely on the capital market to cover all of its financial requirements.

### 1.2 Dividend Policy in Emerging Economies:

There is a plethora of literature that explored the link between firm structure and its DP (Aivazian et al., 2003; Booth et al., 2001; Fan et al., 2009; Glen et al., 1995; La Porta, 2000; Mitton, 2004). Notably, in the context of emerging economies, DP is influenced by Price to Book Ratio (PBR), firm leverage as well as its profit (Aivazian et al., 2003). The firm ownership structure in emerging economies is concentrated (Lin et al., 1998). It is interesting to explore the topic in the context of India in this context.

### 1.3 Theoretical Framework of the Study:

Based on existing literature the following factors are found to be primary determinant of DPR. For example, firm's present profit amount and future profit projections are found to be a significant factor that determines DPR (Benartzi et al., 1997; DeAngelo et al., 2006; Fama and Blahnik, 1968). Similarly, high profitability level in terms of Return on Asset (ROA) is major determinant of DPR (Benavides et al., 2016; DeAngelo et al., 1996; Denis & Osobov, 2008; Fama & French, 2001).

According to Grullon et al. (2002), firms foreseeing a decline in their investment amount have propensity to pay high dividend. Further Bena and Hanousek (2008) found that DPR of a firm signals future growth opportunity of the firm to its investors. DPR of a firm can be used as a monitoring tool, as free cash flow available to firm management can be reduced this way (Brunzell et al., 2014). From this discussion it can be concluded that free cash flow of a firm is an important determinant of its DPR.

Denis and Stepanyan (2011) were of the view that growth rate of a firm is important in the context of its DP. Rozeff (1982) found that high growth firms tend to have low DPR. This finding found support in the works of Jensen et al. (1992), Chen and Steiner (1999), Allen and Michaely (2003); On the contrary, low growth firms tend to pay higher proportion dividend (i.e. higher DPR) (Alli et al., 1993).

It has been observed across the globe that bigger and more profitable firms pay dividend (Denis and Osobov, 2008). Based on literature firm size is taken in this study as one of the determinants of DP (this in accordance to Banerjee, 2016; Dabrowska et al., 2020).

Capital structure of a firm plays a major role in influencing its dividend decisions (Belo et al., 2015; Chay and Suh, 2009). Pertinent to note in this regard that, firm leverage has inverse relationship with DPR (Von Eije and Megginson, 2008).

Level of firm liquidity act as a determinant of DPR (Alstadsaeter et al., 2017). The firm liquidity measure that influences DPR is current ratio (Ho, 2003; Kaźmierska-Jóźwiak, 2015).

Price to Earnings Ratio (PER) is a measure of market risk (Dabrowska et al., 2020), An upward trend in PER may indicate higher expectations of future earning (DeAngelo et al., 2006). PER is taken as a determinant of DPR as per Mehta (2012).

## 2. Objective of the Study:

The current study aims to discuss the determinants of the dividend policy of firms based in the context of one of the largest emerging economies, i.e. India.

## 3. Research Methodology:

### 3.1 Variables Used:

Based on the theoretical framework, the following variables are taken into account for this study.

Table 1: Variables taken into Account

Variables	Symbol	Description
Dividend Payout Ratio	DPR	Proportion of Net Profit paid as Dividend
Profitability	PAT	Profit after tax for the firm year observation
Size	SIZE	Natural logarithm of firm's total asset
Liquidity (Current Ratio)	CR	Current assets divided by current liabilities for the firm year observation. This depicts liquidity of the firm
Leverage	Lev	Ratio of the book value of debt to the sum of the book value of debt and the market value of equity
Growth	Grow	Year on year growth in revenue
FCF	FCF	Free cash flow of the firm
ROA	ROA	Net income of a firm divided by its total assets
Market Risk (PEPER Ratio)	PER	Market price per share divided by earnings per share

$$DPR_{i,t} = \alpha + \beta_1 * PAT_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * CR_{i,t} + \beta_4 * Lev_{i,t} + \beta_5 * Grow_{i,t} + \beta_6 * FCF_{i,t} + \beta_7 * ROA_{i,t} + \beta_8 * PER_{i,t} + \epsilon_{i,t} \quad (1)$$

This model is in accordance with Franc-Dabrowska et al. (2020).

### 3.2 Hypotheses of the Research:

The following hypotheses are created based on theoretical framework and equation (1).

H1: Profitability of a firm has influence on its DPR.

H2: Size of a firm has influence on its DPR.

H3: Liquidity of a firm has influence on its DPR.

H4: Growth of a firm has influence on its DPR.

H5: Leverage of a firm has influence on its DPR.

H6: Free cash flow of a firm has influence on its DPR.

H7: ROA of a firm has influence on its DPR.

H8: PE Ratio of a firm has influence on its DPR.

### 3.3 Data Used:

The data for this research paper is taken from CMIE Prowess database. In total 1134 non-financial firms are taken into account in this study. The period of study is 2001 to 2020.

### 3.4 Methodology:

Data is analyzed in the panel data form. Hausman test indicated that fixed effect method is the appropriate method. Data is in balanced panel form with total 22,680 firm year observations.

## 4. Empirical Results:

Table 2: Empirical results of panel fixed effect method

Variable	Coefficient (Overall Period)	p-value
PAT	1.087***	0.001
Size	2.985**	0.035
CR	-1.571*	0.097
Lev	-5.217	0.141
Grow	3.905*	0.073
FCF	6.802***	0.000
ROA	5.205**	0.027
PER	-3.001*	0.091

\*\*\*, \*\*, \* indicates significance at 1%, 5% and 10% respectively. P-value is indicated in the parenthesis

Based on the table above it is found that, almost all the variables considered for this study are statistically significant. Only leverage is not statistically significant. Also it is pertinent to note that, all the factors have positive influence on DPR, except firm liquidity and firm leverage. The positive relationship of PAT with DPR is on expected lines as firm's with higher profit is expected to have higher proportion profit of paid as dividend. Similarly, firms with higher ROA, growth rate, size, free cash flow and PER are expected to have higher DPR as per literature. We found similar result in our study, with the exception PER. The possible reason for this is to sustain higher PER, firms should re-invest higher proportion of their profit in the business in a fast growing country like India. Whereas we found liquidity of a firm have inverse relationship on DPR, this is on expected lines.

## 5. Conclusion:

Based on this study it can be concluded that, Indian firms more or less show the same trend as their global peers with respect to DPR. Further in the time period of this study, there was global financial crisis (2007-09). In this study, we have checked whether this crisis has any effect on DPR determinants on the dataset from 2010 to 2020. It is found that the determinants of DP are same and variables have similar impact, only the magnitude changed in the post crisis period. It is notable that in the post crisis period leverage has a stronger negative impact on DPR. This confirms that, in the post crisis period firm managements became conservative with respect to debt. This is an important finding in the context of a major emerging economy like India. This study adds to existing literature on dividend policy of firms in the emerging country context.

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# Role of social media in crowd funding

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## **Abstract:**

*Crowd funding is a platform in which the needy, privileged & underprivileged both persons can raise funds through various social media platforms. It has emerged as a place where in deserving can be helped by contributing amount for the various purposes like business, education, health, natural calamities etc. The purpose of this research is to define the influence of social media on crowd funding. The data on the various crowd funding instances were collected from Internet. This data established a number of statistically relevant connections between the social media and the usage of funds. The aim of the research is to explain the modus operandi of social media on crowd funding. **This paper emphasise how social media helps various crowd funding projects to succeed. This paper also helps to know more about the effects of social networks in crowd funding.** We evaluate the link between the crowd funding and social media. In this paper we have explained how social media and crowd funding have saved several lives and business projects. At the outset we have put it across how the social media and crowd funding has come to the rescue of several people.*

## **Key words:**

Social media, crowd funding, network, people, lives, help, health, education.

## **1. Introduction,**

### **Crowd funding**

Crowd funding is platform in which people can raise funds through Joint contributions of general public (crowd). It has emerged as a billion dollar business for supporting more than one million ventures. However, very few research works have examined the process of crowd funding. In particular, none has studied how social networks help crowd funding projects to succeed. To gain understandings into the effects of social networks in crowd funding, we analyze the hidden connections between the fundraising results of projects on crowd funding websites and the corresponding promotion campaigns in social media. Our analysis considers the dynamics of crowd funding from two aspects: one is how fundraising activities and promotional activities on social media simultaneously evolve over time, secondly how the promotion campaigns influence the final outcomes. From our study we identify a number of important principles that provide a useful guide for devising effective campaigns.

Crowd funding has emerged as an alternative source of funding for various types of projects. In the beginning, crowd funding was mainly used to finance artists from different sectors (Agrawal, Catalini, & Goldfarb, 2013 ; Harzer, 2013 ; Meinshausen, Schiereck, & Stimeier, 2012). The establishment of various crowd funding Internet platforms in the music sector (e.g. ArtistShare, SellaBand) made this form of financing interesting for musicians. Subsequently,

other artistic and creative areas (e.g. film, journalism) have adopted the idea. Funding of companies through the crowd has been discussed further since 2010 and explored in practice and theory.

Unlike traditional ways of fundraising, where the initiative used to receive a number of major investments from venture capital firms, in crowd funding, the assignment receives support through a large number of small contributions from individuals. As a result crowd funding presents a mixture of entrepreneurship with social network participation, in which the general public play an unexpected role. Social media (e.g. Twitter, Facebook, and Google Plus) plays an important role in promoting crowd funding projects. Both enterprises and customers can keep track of a crowd funding campaign on social media, and obtain useful insights in real-time. For example, enterprises can analyze social media data to forecast the prevalence of the initiatives in order to adjust strategies accordingly. While customers can also make use of social media to identify promising projects that are more likely to be successful and lead to more rewards for the investments. Forecasting the outcomes of crowd funding projects is very imperative for both enterprises and customers.

Crowd funding has several unique properties that makes it different from conventional information diffusion process in previous works. First, crowd funding is usually a time-Constrained process which is quite different from the ever- lasting process of information diffusion. For example, the fundraising process of a Kick starter project can last from 1 to 60 days. Second, a project in crowd funding should set a certain goal for fundraising, while the orthodox data diffusion process doesn't have a collective goal from the crowd. Third, crowd funding involves a various roles, including the promoters who spread information about the project in social networks and the sponsors who pledge funds on the project. Due to these unique properties, the mechanism of crowd funding cannot be assessed by prior works effectively.

## **2. Social Media:**

Social Media is the new trend in today's time and age. Social media has become an essential part of everyone and is basically considered this cohort's language. Again what is to be noted, is that social media is not only limited to the millennials but also people of all ages. Be it making a Post or uploading one's moments on Facebook or even Instagram, Or even making a statement or putting down one's opinion, say on a platform like Twitter, Social media not only has made lives and moments special but also a tool to market, advertise as well as to spread awareness.

Social media are interactive, computer-mediated technologies that facilitate the creation or sharing of information, ideas, career interests, and other forms of expression via virtual communities and networks. As per the Oxford Definitions: Social Media constitutes websites and applications that enable users to create and share content or to participate in social networking.

To make these definitions into an easy sentence and simplify it, we can say that the 'Social' in 'Social Media' refers to the sharing of ideas, information, messages, and other forms of content amongst people. On the other hand, the 'Media' in 'Social Media', thus, refers to the forms, or the medium through which this content is communicated and shared among the people.

Therefore, placing these definitions together, we can definitely say that Social Media is the series of websites and applications that allow people to exchange information and content on a real-time basis.

Social Media Platforms, as stated before, refers to the platforms or the stage through which these content are exchanged and includes several websites and applications like Facebook, Twitter, Instagram, YouTube, LinkedIn, and over 300 other social websites that contribute to even social media marketing as well.

We are dwelling in an era, in an age where it is possible to be connected and to stay in touch with every one of our associates, ideals, our near and dear ones. Even though we may not be physically present to actually communicate, we can still be connected to everyone we know – our childhood pals, high school and college friends, teachers, our loved ones and the list goes on.

Through Social Media, a single post can get viral and reach billions of people at the same time. A single video, having the right kind of content can easily cross a million views on YouTube. In this 21st Century, Social Media plays an important role in defining the success or the failure of a business. That is how crucial Social Media content is. Be it a small business or a big one, or even start-ups see quite a profit potential through Social Media. This is only possible due to its easy availability, accessibility, and response due to the masses utilizing social media websites and apps for various purposes.

This can also be explained in the fact that nowadays if a business has social media presence, a ton of money automatically gets saved instead of being invested in all promotion methods like hoardings and advertisements to make its presence known. However, just owning an account or having a simple social media presence is not enough to push the business to profitability. What drives the business is the active presence of the business on social media platforms. This directly as well as indirectly brings in brand loyalty for the business.

However Social Media builds trust between businesses and their clients helps to bridge distant relations by helping friends and family stay in touch, brings people closer, and keeps them connected through shared moments, videos, pictures, and such content. Some of the examples of social media campaigns are as follows:

### **Facebook**

With 1.32 billion daily active users, Facebook definitely a must when it comes to crowd funding. It gives you the opportunity not only to create a page and build a community around your brand, but also to target your ads towards very specific places. By doing this, you won't be wasting money and resources to spread your message in front of users who have no interest in what you are offering or people who have no idea what crowd funding is. Instead, if you use Facebook properly, you will be able to share your crowd funding campaign with the people who are most likely to back your idea;

### **Twitter**

Is another platform that has proved to be effective for promotion of crowd funding campaigns. Although your messages there should be as brief as possible, it's still a great platform to spread the word and build a following by researching and strategically using popular and relevant hash tags;

### **LinkedIn**

Is a great way to reach investors for equity crowd funding campaigns. Keeping your page up-to-date with all business-related news and updates will help you build a strong presence in front of business-oriented people and industry professionals.

### **Instagram**



Could also be highly beneficial for your crowdfunding campaign, but it doesn't work well for all types of businesses. The industries that tend to perform well on the platform are related to food, DIY, design, fashion. This should not discourage you to integrate Instagram into your marketing strategy, just don't rely too heavily on it. If you decide to promote your campaign on this platform, don't forget to add relevant hash tags to your posts so people outside of your network will also be able to find you.

### **Reddit**

With more than 82 billion page views per year, Reddit is an online powerhouse. The platform is an excellent place to engage with niche communities, but you should keep in mind that the website has strong policies against people who only use it for self-promotion.

### **3. Review of the Literature and identification of research gaps**

The term crowd funding implies raising finance from a large number of resources. Our review encompasses all types of crowd funding, which include donation-based, reward-based, lending-based and equity-based crowd funding. This literature review is structured according to the main players in crowd funding: capital seekers, capital providers, and intermediaries.

Ketto.org is the most popular and trusted crowd funding platform in Southeast Asia. Varun Sheth, Zaheer Adenwala, and actor Kunal Kapoor co-founded the company intending to bridge the affordability gap. Ketto.org allows people to raise money for health and medical emergencies, natural disasters, education, short-term emergency needs, animal welfare, women empowerment, and many other causes.

There are various literature reviews on crowd funding. Like Bachmann et al. (2011) discuss the main results of 43 scientific articles on peer-to-peer lending. Feller, Gleasure, and Treacy (2013) structure research on crowd funding quantitatively according to the different forms of crowd funding without considering the specific contents of these studies. There is no comprehensive overview of crowd funding literature focusing on companies as capital-seeking parties. However the following review closes this research gap.

The scientific articles on crowd funding were identified in the first step in a Google Scholar title keyword search for the terms "crowd funding" The search lists 531 hits. In the next step, the search was continued based on the references cited in the articles. Afterwards, specific terms, such as peer-to-peer online lending, P2P lending, social lending and person-to-person lending were examined. Due to the fact that this is a new topic, there are few studies published on this subject. For this reason, we included (unpublished) working papers in the review. The final selection of articles and working papers is based on the following criteria:—We only considered scientific articles and working papers. Practical contributions, information guides and seminars, only those contributions were taken into account which appeared relevant in this context. The main focus was on economic research papers. Using these criteria, 127 articles and working papers were selected for the literature review. Development of Scientific Research in Crowd funding is a recent phenomenon. Thus, many research papers on crowd funding follow a phenomenon-based approach (Von Krogh, Rossi-Lamastra, & Haefliger, 2012 ). This involves developing a definition and description as well as a differentiation to related subjects and concepts. Before the term "crowd funding" appeared in literature, scientific

articles on lending-based crowd funding used the terms “social lending” (Hulme & Wright, 2006 ) and P2P lending (i.e. “peer-to-peer”) (Freedman & Jin,2008 , 2014 ; Herzenstein & Andrews, 2008 ; Klafft, 2008 ).The first scientific discussions mentioning “crowd funding” were mainly focused on the legal issues under U.S. law. In 2009, Kappel analysed the legal restrictions of crowd funding under the Securities Law from1933 using the music industry as an example. Subsequently the legal restrictions of crowd funding dominated U.S. legal literature (see Sect. 2.3.3 ). Belleflamme, Schwienbacher and colleagues began 345 discussing venture financing through crowdfunding in 2010 (Belleflamme & Lambert, 2014 ;Belleflamme, Lambert, & Schwienbacher, 2010 , 2013a , 2013b ; Schwienbacher & Larralde, 2012 ) (seeSect. 2.3 ). A number of scientific contributions have since emerged, following a descriptive, explanatory or concept-based approach, often in combination with case studies from the respective national context(Giudici et al., 2012 ; Hemer, 2011 ; Hemer et al., 2011 ; Ingram, Teigland, & Vaast, 2014 ; Klaebe & Laycock, 2012 ; Kortleben & Vollmar, 2012 ; Martínez-cañas, 2012 ; Meinshausen et al., 2012 ; Mitra,2012 ; Tomczak & Brem, 2013 ; Vitale, 2013 ; Wheat, Wang, Byrnes, & Ranganathan, 2013 ).The first empirical studies are qualitative-empirical and describe the phenomenon. Initial market data were analysed and enhanced with findings from interviews (Aitamurto, 2011 ; Gerber, Hui, & Kuo, 2012 ;Hemer et al., 2011 ; Ley & Weaven, 2011 ; Röthler & Wenzlaff, 2011 ). Research based on quantitative data began to emerge after the platforms established themselves as intermediaries and the required transaction volumes became available or first surveys were conducted (e.g. Ahlers, Cumming, Günther, & Schweizer, 2013 ; Burtch, Ghose, & Wattal, 2013a ; Kuppuswamy & Bayus, 2013 ; Mollick, 2014 ;Mollick & Kuppuswamy, 2014 ; Pierrakis & Collins, 2013).

#### **4. Objectives of research work:**

As stated before, Social Media plays a crucial role in the creation as well as the exchange of content. However, apart from this, the Social Media platform aims to serve and fulfill its core objectives along with the objectives of the business or the brand using social media as a tool to market their brand.

The First and the foremost aim of our research is to educate our society as a whole, to build our society up, and spread awareness. This objective is applicable to Social Media as it is such a tool which connects everyone in today’s time, all around the globe, just through the click of a button; easily accessible through the internet, websites, and apps. One can conduct surveys through social media and ask anyone in their reach to voice their opinions. Social media has made connectivity so easy that even though people are not within each other’s immediate reach, they are still connected and can easily voice their own opinions as well as encourage others to state their opinions. Society can not only be educated about merchandises but also on topics relevant to civilization. Apart from advertisements, a consumer can explore, analyze, and make informed decisions about products they are interested in acquiring. That way they can make an informed purchase that is perfect for their specific requirements. Social Media also helps promote and stabilize the buyer-seller relationship and helps the buyer to compare the prices of similar products across several websites.

Another objective is to know how the Social media helps in promoting your crowd funding project- An effective social media strategy will increase the awareness of the campaign and will drive more traffics to your site. It could be the best way to reach more people, so the first

step is to create a profile on every social media platform while launching your Crowd funding platform.

The main focus is to enhance the opportunities and make a positive impact on society.

To know how easy it is to capture people's attention- You can easily capture people's attention by sharing different engaging information about your project and news related to your project. Regular and consistent posting on social media could keep your project top of mind.

To know how it can gain support and interest easily- Gaining support and interest on social media is easy for crowd funding as an influencer means blogger or celebrity you can find individuals in your slot and ask them to share your scheme for a service in return.

To know which social media platform can target the type of audiences-There are multiple social media platforms like Facebook, Instagram, Twitter, LinkedIn etc. The different platforms can target different audiences for your campaign.

As on Facebook you can share long videos and can create awareness about your project. You can develop a sense of community around your project using Facebook.

Instagram is famous for short videos and reels, you can promote your campaign on Instagram easily. It is the place where you can share more personal elements and can develop trust with your audience.

LinkedIn is a business platform. Here you can find business professionals who can support you and share your campaign with their connections.

Twitter is a useful place to share updates, events and initiate a discussion with your supporters.

For commerce some objectives of using social media in crowd funding includes:

- Increase brand awareness.
- Share carefully curated content.
- Encourage engagement and leads.
- Generate traffic.
- Connect with audience and other businesses.
- Increase brand loyalty.

### **5. Here are some six basic ways that campaigners can make the most of social media for fund raising:**

- **Select a Relevant Platform**

Consider which platform can help you gather a dynamic target audience before delving into social media behemoths like Facebook and Instagram. A well-thought-out strategy will be useless if you are unable to reach your target audience. Investigate different crowdfunding niches based on your cause. This will eventually attract more attention to you. You can then carry out your campaign strategy to target specific groups.

- **Tell Your Story in a Way That Will Satisfy Your Target Audience**

The goal of your fundraiser story is to persuade donors to support your cause wholeheartedly. Your story is the fundraiser's voice. Define the key elements of your story and respond to any pertinent questions about your fundraiser. Set a theme for your story and build up to a point of tension to highlight the importance of your cause. Finish with a solid call to action.

- **Showcase Your Achievements**

While developing your campaign strategy, establish a few benchmarks. As you cross them off your list, proudly display them on your social media handle. It is critical to show your donors your fundraiser's progress and milestones. Inform them of how they have aided in improving the patient's health through updated reports and tests. This will benefit potential donors and increase their willingness to contribute to your cause.

- **Donor Appreciation**

Thank your donors loudly and clearly! Thank them for their generosity and assistance in bringing about a positive change for your cause. Repost and reshare posts from their personal handles and accounts on social media platforms such as Twitter, Facebook, and Instagram. Tag them to invite them to share in your small victories. When it comes to conversing and connecting with these donors, this will go a long way. To gain maximum traction for a successful fundraiser, incorporate these fundamentals into your social media strategies.

- **Boosts Your Exposure**

Even if recent (and ongoing) algorithm changes on Facebook and Instagram have put businesses and nonprofits at a disadvantage, this does not mean you are at risk of being hidden from your donors. The opposite is true; all you have to do is work for it.

- **Increases Referrals**

Online fundraising through social media helps your organization raise money and awareness through organic, referral-based growth. These referrals, in particular, are more easily obtained via social media. It is relatively simple for one of your supporters to share the campaign online, potentially resulting in a chain reaction of new people learning about your cause, donating, and sharing the campaign with their networks.

### **Conclusion:**

In this digital era, social media plays a vital role to promote any products or services. You can find your audience easily over here. Nothing could be better than social media platforms to promote your campaign and it will help your campaign to succeed. One can read about trending and important news about hot topics around the globe, news of genres ranging from weather, fashion, health, lifestyle, entertainment, politics, and thus, be informed with the help of social media apart from the mainstream media.

Remember that social media communication is a two-way street. As much as possible, respond to anyone who uses your campaign hash tag and try to inoculate some humor into the conversation. Social media, when used correctly, can help charities reach far larger audiences while promoting their causes and building long-term relationships with donors. Furthermore, it provides fundraising professionals with invaluable data on the effectiveness of their efforts and how to improve in the future.

As crowd funding flourishes as a feasible fundraising strategy through the collective efforts by participants who network and pool their money together – in many businesses it becomes useful to think about how to attract more contributions. In this paper, we presented the underlying connections between promotion campaigns in social media and the fundraising results of crowd funding projects, and identified a number of important principles that guide the direction of devising an effective campaign. We also demonstrated that the features arising from social media can help improve the accuracy of predicting eventual outcomes, specifically how popular a project will be, and which projects are likely to successfully reach the fundraising goals. In summary, our results provide a promising step towards inferring the impacts of social media on crowd funding. We anticipate that further analysis could quantify personal interests of

participants from historical behaviors, develop richer ways of assessing social influences among users, and suggest potential patrons from collaborative filtering of personal interests and social influence.

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## Balancing Income-Expense in life in Price Inflating economic situation: Challenges of Informal Entrepreneurs

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### **Abstract**

*CoVID 19 had raised its havoc in March 2020 leaving behind all; fear, threat, and uncertainty. Lockdown had been implemented all over the world to break the chain of spreading the disease leaving human life at a standstill and economic activities to a halt. It affected different walks of life in various proportions. This paper analyses how the job loss, wage cuts and income loss affected families, individuals and children. The study was conducted in Bengaluru Urban and 489 respondents and data was collected using convenient sampling. Percentage analysis is used in this paper. The income shrinkage affects the routine life of family, healthcare and education of children etc. . The outcome of the study shows that the informal labourers, self-employed and private sector employees are affected adversely. The CoVID 19 epidemic reduces the opportunity of many unprivileged and it is the onus of the Governments to rehabilitate the victims and to ensure a support in building of the children whose life is hindered by the calamity and difficult to return to normal life. Psychological efficiency of the children is another challenge to be addressed. A policy for the Governments is essential to cover the losses in life so that the children do not lose opportunities in life.*

**Key words:** psychological stress, CoVID 19, Economic slowdown, pandemic, expenses

### **INTRODUCTION**

Life expenses may be explained as the average income needed for a family to meet the expenses for their day to day life. It depends on many factors, Age, gender, education, occupation, Income, marital status, etc. There is a strong relationship between the cost of living and living style. Cost of living (Latimaha, Ismal, & Bahari, 2020). The standard of living may be defined as the material adequacy enjoyed by an individual at a point of time so that both conveniences need and utility of products are fulfilled (Bank Negara Malaysia, 2015). Adequacy of income for nutritious food, health care, education, safe and secure living is considered as a parameter for 'The quality of life' (Economic Planning Unit Malaysia, 2012). The reasonable level of consumption may be defined as the quantity of consumables needed for a family to meet the essential requirements (decent minimum standard of living) as explained in commodity basket method (Aatola & Viinisalo, 1995). The consumption may be further explained as how a consumer fits his basket to the income by Giffen effect (Baruch & Kannai, 2001) and Veblen effect (Bagwell & Bernheim, 1996).

The recession of the business cycle is the period in which the economic productivity of an economy reduces along with earning potential of the customers (Reed & Crawford, 2014). The CoVID 19 was one such situation in which the economic activities were stopped abruptly to prevent the spreading of the disease (Feroni, Marcellino, & Stevanović, 2020). The prolonged

lock down compelled the companies to scale-down their operation and it affected the employment reduction and wage payments.

In the post COVID 19 period, the informal enterprises gradually recovered along with the normalizing social life though the difficulties of increase in petroleum price affected adversely.

### **Employment losses during CoVID 19**

The CoVID 19 caused a fall in global working hours in 2020 by 8.8% compared to the fourth quarter and it is equivalent to 255 million full-time jobs. It is four times the working hour loss of 2009. The fall of 4.6% in working hours is equivalent to 130 million full-time jobs. The unprecedented employment losses in 2020 relative to 2019 is 114 million jobs. In relative terms, employment losses were higher for women (5.0 per cent) than for men, and for young workers (8.7 per cent) than for older workers. The inactivity of unemployment increased by 81 million. The global labour force is reduced by 2.2% and to 58.7%. The unemployment will increase by 33 million in 2020. The unemployment has increased from 1.1% to 6.5%. Global labour income (before taking into account income support measures) in 2020 is estimated to have declined by 8.3 per cent, which amounts to US\$3.7 trillion, or 4.4 per cent of global gross domestic product (GDP). The income loss varies from one economy to another (International Labour Organization, 2021). The CoVID 19 had affected the lower income strata of population all over the world as they engaged in physical jobs and the stagnancy of public movement and economic activities affected their earnings. The most affected segment is informal employees all over the world (Parker, Minkin, & Bennett., 2020). The lockdown affected different industries in non-uniform scale and they are grouped based on the risk exposure. The classification is given as, high risk, medium high risk, medium risk, low medium and low risk. The high risk was observed in manufacturing, retailing, real estate and restaurants & Hotels etc. where the physical involvement is high in closed spatial enclosures. The second categories of high medium risk sectors include logistics, informal workers, arts and personal services. Medium risk segment includes mining, quarrying, financial services and insurance, and construction. The low-medium risk includes agriculture while low includes utilities, public administration, health and education. (The impact of the COVID-19 pandemic on Jobs and Income in G20 economies, 2020). The high risk category and high medium segment is an employment provider for informal labourers in the formal sector. The lockdown affected the employees of these sectors as either wage cuts or job loss. The high positioned employees had a ‘V’ shaped ‘job constraint’ while the low and middle positioned employees had faced ‘furlough’ or job loss for many months. The effect of reduction in spending pulled down demand and supply of products causing scaling down on production and employment opportunities. This caused the recession in the economy. The fall in GDP decreased public spending causing a fall in employment opportunities and the CoVID 19 caused many health issues among the public to increase spending on medicines and health care. Poverty, illness, and expenditure on shelter became a challenge for lower strata of population as they are informal. The fall in Foreign Direct Investment and local production caused an increase in debt of Governments (Measuring the impact of CoVID -19 with a view to reactivation, 2020).

### **Effects on CoVID on Common Man**

**Table 1: Job loss**

<b>Effect</b>	<b>Article</b>	<b>Response</b>
Job loss / Pay Cut	(ABC NEWS/ WASHINGTON POST POLL: CoronaVirus and the economy, 2020)	The Government extend support to the companies to reduces recession effect
Young workers hit hard by the COVID-19 economy	(Gould & Kassa, 2020)	Workers ages 16–24 face high unemployment and an uncertain future
The U.S. Labour Market During the Beginning of the Pandemic Recession	(Cajner, et al., 2020)	Salary cuts and job falls were low in firms those continue in business than those faced closures
Job loss in India	(Nandal, Nandal, Dhingra, & Sachdeva, 2020)	Lockdowns slowed down the business, increasing job loss. Slow down reduced new job opportunities

**Table 2: Psychological**

<b>Segment</b>	<b>Article</b>	<b>Response</b>
Students	(Chaudhary, Sonar, Jamuna, Banerjee, & Yadav, 2021)	Three psychological issues like fear of CoVID 19, mild depression and severe anxiety observed
Adults	(Grover, et al., 2020)	The job loss and wage cut has caused me depression and anxiety in all age groups, especially those financial commitments. Uncertainty in returning to normalcy was the main concern for all. This caused a lot of health issues as well.
Children	(Parekh & Dalwai, 2020)	The children were worst affected psychologically and physically due to the isolation from active school activities. Change in sleeping hours, overhanging on mobile; spill over of effects of family conflicts, difficulty to communicate their issues with others etc. affected behaviour of children

**Table 3: Social and Economic effect**



Segment	Article	Response
Consumption	(Inani, 2021)	Sudden fall in buying capacity reduced the consumption and demand for products. This washed away the investment of small enterprises and their dependents. This increased unemployment and economic stagnancy in informal sector
Social life	(Knowledge@Wharton, 2020)	Job loss reduced the income of households and caused multiple issues in society. The migration of laborers and employees to their natives and prolonged lock down hard hit the real estate and those living on rent income. Fall in income compelled the parents to shift their children to low cost or Government school to reduce education cost. A fall in demand for higher education courses affected HE institutes and even may affect supply of quality talents

### The effect after COVID 19

The primary data of this research identified that the purchasing power of informal labourers and entrepreneurs decreased due to the inflation. The inflation will increase to 7% in August 2022 from 6.71% in July 2022. Prices of essential commodities like Fish, meat, vegetables, oil, fruits, and spices, increased in the range of 172 - 206% with reference to July 2022. Consumer index increased by .52% (CONSUMER PRICE INDEX NUMBERS ON BASE 2012=100 FOR RURAL, URBAN AND COMBINED FOR THE MONTH OF AUGUST 2022, 2022). There is an increase in inflation from October 2021 (4.48%) to August 2022 (7%) (India Consumer Price Index (CPI), 2022). The price of essential commodities increased due to the increase in fuel price.

### Research methodology

This empirical study is an extension of the analysis of information collected from the reports in Bengaluru District in Karnataka. The respondents of this research are 489 and collected from different populations like farmers, traders, informal labourers, self-employed, private sector employees and Government employees. The data was collected using a questionnaire made on five point Likert Scale. The reliability was tested using Combat alpha (more than 0.756) and the validity and consistency was tested using test and retest method.

Percentage Analysis is used in this paper to explain the effect on CoVID 19 on respondents

### Analysis and Interpretation

**Table 4: Distribution of respondents**

Category	No of respondents	Percentage
Farmers	49	10.02

Traders	<b>89</b>	<b>18.20</b>
Informal labourers	<b>98</b>	<b>20.04</b>
Self employed	<b>69</b>	<b>14.11</b>
Private sector employees	<b>123</b>	<b>25.15</b>
Government employees	<b>61</b>	<b>12.47</b>
<b>Total</b>	<b>489</b>	<b>100</b>

Informal traders (20.4%) and private sector employees (25.15%) are the largest in the respondents. The effect of CoVID on different walks of life was different.

The effect of sudden change in economic conditions , especially the slow-down, affected the personal income, saving and occupation. (Table 5). Farmers are affected due to sudden fall in demand during COVID as the markets were closed down and ended up in crop wastage , especially in fruits and vegetables. Farming is a second income for many families and they invest the income in other sources in agriculture and end up in a cascaded loss. Traders also faced a severe fall in income, especially those who sell non-food products. Informal labourers, self-employed and private sector employees faced wage loss or working day loss. Government employees were not affected severely though they had been in war-front for implementing Government plans in fighting against the pandemic. Saving also fell drastically for informal workers, self-employed and informal traders.

**Table 5: Challenges faced by the informal entrepreneurs ( measure is weighted average and max score : 5 )**

Variable	Farmers	Traders	Informal labourers	Self employed	Private sector employees	Government sector employees
Fall in business volume	<b>2.3</b>	<b>3.9</b>	<b>3.1</b>	<b>3.4</b>	<b>3.1</b>	-
Savings/earning	<b>1.6</b>	<b>1.3</b>	<b>0.6</b>	<b>0.9</b>	<b>1.9</b>	<b>4.1</b>
Profitability	<b>1.1</b>	<b>1.5</b>	<b>1.9</b>	<b>1.4</b>	-	-
fall in income	<b>3.2</b>	<b>3.6</b>	<b>3.9</b>	<b>2.0</b>	<b>1.7</b>	-

**Effect of Price increase and economic slowdown on personal life**

**Table 6: Job/ Wage/ Income loss**

The recovery period from COVID 19 was not favourable for the respondents as the loss or debt already incurred is large enough to recover. Income loss incurred to all respondents groups, especially for those who seek additional income. In the case of farmers, especially for low scale

producers, low price for agri-products comparing to the cultivation cost, causes income loss for them ( Table 6)

Table 6 : Wage / Income loss

Variable	Farmers	Traders	Informal labourers	Self employed	Private sector employees	Government sector employees	Total
<b>Job loss</b>	0	0	59	0	29	0	88
<b>%</b>	0	0	60	0	24	0	18
<b>Wage loss</b>	0	0	54	0	73	0	127
<b>%</b>	0	0	55	0	59	0	26
<b>Income fall</b>	49	59	54	69	86	18	140
<b>%</b>	100	66	55	78	70	29.5	28.6

The effect of job loss, wage loss and income loss affected the routine expenses like, adequate food for family, clothing, education, health care, travelling and rent. Informal labourers (81%) and self-employed (52%) faced poverty in food as there was drastic fall in income. Government had introduced Direct Benefit Transfer to the deserving people. The data shows that the informal labourers face a severe constraint in all the life expenses. Self-employed (71%), and Private sector employees (78%) faced difficulty in meeting education expenses of children and 46% of these respondents changed the institute from private schools to government schools. It affected the continual of education in higher education (33%) sector also for the students who do not have any education loan. Small traders (60%), informal labourers (57%), and Private sector employees (63%) faced difficulty in meeting health care expenses. The respondents who have health care insurance (33%) could manage the treatment expenses without compromising quality of treatment. Similarly, informal traders (54%), self-employed (54%) and private sector employees (75%) pay rent regularly due to salary cuts. Default in payment of loan or other commitments was another issue faced by the low income families. 42% of the respondents faced the default problem (Table 7).

Table 7: Life Constrain during and after CoVID

Variable	Farmers	Traders	Informal labours	Self employed	Private sector employees	Government sector employees	Total
Adequate food for family	6	19	79	36	12	0	152
<b>%</b>	12	21	81	52	10	0	31
Clothing	11	13	59	28	7	0	118
<b>%</b>	22	15	60	41	6	0	24
Education	7	29	15	63	69	0	183
<b>%</b>	14	33	15	71	78	0	37
Health care	9	53	56	29	56	0	203

%	18	60	57	33	63	0	42
Travelling	10	47	58	32	59	0	206
%	20	53	59	36	66	0	42
Rent	6	29	53	48	67	0	203
%	12	33	54	54	75	0	42
Payment defaults	39	69	39	49	59	19	274
%	80	78	40	71	48	31	56

The life of isolation from friends and relatives affected the different age groups in different ways. The psychological stress of the earning members due to the uncertainty in income sources and shrinkage of income caused family unrest in families in many ways, anger, intolerance etc., ending up family quarrels ( informal labourers (42%) and self-employed (57%)) due to the inconsistency in job opportunity and wages. Alcoholism and Addictions seemed to be prominent for the private sector (78%) and government employees (64%). The harassment in families was high among private sector employees (63%), self-employed (44%) and Government employees (41%). One of the reasons for household harassment includes dowry (68%), inadequate funds for routine expenses (26%), and doubts on spouses (31%).

**Table 8: Negative impacts**

Variable	Farmers	Traders	Informal labourers	Self employed	Private sector employees	Government sector employees	Total
Psychological strain of Children	7	23	39	41	12	19	141
%	14	26	40	59	10	31	29
Family quarrel/issues	9	29	41	39	7	21	146
%	18	33	42	57	6	34	30
Alcoholism/ Addictions	12	19	32	41	69	39	212
%	24	21	33	46	78	64	43
Harassments/ Assaults	15	32	34	39	56	25	201
%	31	36	35	44	63	41	41
Increase in borrowing/debts	12	39	61	62	59	12	245
%	24	44	62	70	66	20	50

Involvement in social issues/ crimes	13	41	46	31	67	32	230
%	27	46	47	35	75	52	47

Increase in debt, especially credit card payments (31%) and personal loan (26%), was observed in self-employed respondents (70%) and private sector employees (66%). There is an upward trend in social crimes as well during CoVID period.

All these affect the psychological health of the children. The anxiety and mild depression was observed among children. The uncontrolled exposure to the internet caused the exposure to uncensored and unsecured sites and games leading to suicides and behavioural issues. This affected their cognitive as well as emotional behaviours as well. Uncertainty in career and unemployment among fresh graduates etc. are challenges expected.

### Discussion and Suggestions

The worst affected respondents are informal labourers, self-employed and private sector employees. The informal labourers include migrated labourers who were affected the worst, especially in their return to their hometowns. The state and central governments can propose an insurance scheme for all the citizens who are under a certain annual income to cover the expenses of citizens during the epidemics and natural calamities. The Direct Benefits Transfer can be used to the registered citizens. It can reduce poverty, especially food and healthcare expenses. An educational policy to support the education of the children during pandemic seasons and natural calamities are highly needed to ensure productive citizens. These schemes can give opportunities to those students whose career growth is at stake due to non-affordability of educational expenses.

Increase in payment defaulters, home violence, substance abuse, alcoholism, prostitution, human trafficking are increasing in the Post COVID period due to the economic shrinkage in the low income strata of population. Inadequate measures by the Governments to supplement the income loss or employment loss is aggregating the downslide of financial stability of low income families. This reflected an increase in crimes. The number of carriers and sellers of drugs and other narcotic products increased very high (PTI, 2022). Substance abuse is becoming a big threat that the addiction level in youth reduces talent supply and economic growth.

Continuous price increases of petroleum products are affecting low income people that their saving and consumption decreases. It is also observed that the job loss due to the automation of sales/services activities increased unemployment in skilled employees. This trend is high in senior employees.

In the author's perspective, the Central Government has to introduce subsidised financial support to the potential informal entrepreneurs ( who have turnover less than Rs 19 L per annum), subsidy to petrol/ LPG used for business and lower interest loans for business. The implementation of strategies used for encouraging micro industries must be extended to all who are interested in a business rather than limiting it to manufacturing alone. Unless the informal

sector is not stabilised, the consumption power of our population decreases, especially for non-food products. It is a cyclic process.

### **Limitation and scope for future study**

The research was conducted only in Bengaluru Urban and it covers only categorical data to understand how different variables are distributed. Hence, only percentage analysis is conducted. There is a future scope to analyse the factors that affect job loss and reaction of the respondents for alternative strategies.

### **Conclusion**

The natural calamities and sequence of epidemics become very common and these affect the lower income strata of the population, especially informal sector entrepreneurs and labourers. There is a need for policies and strategies for State and Central Governments to support the affected people for food, clothing, and health care. Adequate precautions to be taken to ensure the opportunity for every child to develop healthy physical and psychological capabilities that they can emerge as a productive citizen. The unprivileged children should not lose opportunity in their career due to the environmental constraints. The financial constraints due to natural calamities and epidemics should be covered for unprivileged and affected families as the recovery from loss is beyond their control. There must be coverage for all citizens from the Governments as the intangible contribution of the informal sector cannot be ignored in nation building. In brief, the job loss or wage cut or income loss of the unprivileged in situations like CoVID 19 has to be compensated such that they can return to the nation building process.

Increase in crime is a big challenge to the economic growth and confidence in India in tourism, investment, etc.. The need to extend informal entrepreneurship is a need to prevent poverty, unemployment, crime etc.

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## Behavioural Biases and Investment decision-making

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### **Abstract**

*Behavioural finance contradicts the notion of perfect rationality and identifies cognitive and emotional factors and their impact on investment decision-making. Behavioural finance theories are more focused in understanding the cognitive, social, and emotional biases of investors and to analyse how these biases influence the market prices, returns, and allocation of resources. Behavioural finance is a novel area that examines investor decision-making processes in order to better understand anomalies, or deviations. Investors may be inclined toward various types of behavioural biases, which lead them to make cognitive errors. The paper examines impact of behavioural biases on investment decision-making. Specifically, the study considers herding, heuristics, prospect theory, familiarity, overconfidence, representativeness in making investment decision. The study found that there is impact of these behavioural biases on investment decision-making and there is significant relationship between these biases.*

**Keywords:** behavioural finance, behavioural biases, investment decisions

### **Introduction**

The underlying premise of traditional investing theories is that investors always act in a way that maximises their return. However, numerous studies indicate that investors are not always so logical. When uncertainty surrounds an investing decision, people become perplexed. Markets are not always efficient, and people are not always logical. Behavioural finance explains why people do not always act in the way that is anticipated of them and why markets do not consistently behave in the way that is expected of them. In order to explain why people, make illogical financial judgments, which are common in the stock market throughout the world for investment decisions, behavioural finance is a new discipline that aims to merge behavioural and cognitive psychological theory with conventional economic and finance.

The study of psychology and sociology as they relate to financial professionals' behaviour and how that conduct affects the market for securities is known as behavioural finance. Therefore, it can be inferred that behavioural finance is the application of scientific research on the psychological, social, and emotional effects on market players and trending market prices as it investigates the psychological and sociological elements that affect how various individuals, organisations, and organisations make financial decisions (Chaudhary, 2013).

The systematic study of behavioural finance got its start with a discussion of the various heuristics influencing investment decisions by Daniel Kahneman and Amos Tversky in 1973. In Tversky & Kahneman (1979), they developed the well-known Prospect Theory, which holds that people react differently to identical circumstances depending on whether they are presented in the context of gains or losses. They also discovered that people are much more distressed by prospective losses than they are happy by comparable gains (Sharma, 2014).



Investors, according to (Statman, 2014), are sensible individuals who are neither irrational nor insane and suggests that they are also normal, with brains that are sometimes bursting and emotions that are frequently overflowing, meaning that we are occasionally normal smart and normal stupid.

The limits of arbitrage and cognitive psychology are the two foundational tenets of behavioural finance. Cognitive refers to the process of thought. Numerous studies in psychology have shown that people consistently make mistakes in their thinking, including being overconfident and placing too much emphasis on recent experiences. Furthermore, their preferences could lead to distortions. Instead of taking the conceited stance that this corpus of information should be disregarded, behavioural finance makes advantage of it. Limits to arbitrage refers to determining when and under what conditions arbitrage forces will be effective (Ritter, 2003)

When making financial decisions in the face of uncertainty, behavioural finance investigates the subtle aspects and interactions in the human brain. Our choices about money are heavily influenced by the most prevalent human traits (fear, wrath, greed, and selfishness). The three factors that influence human decision-making are intellect (appreciating the circumstance), reason (thinking the long-term effects of the action taken), and emotion (evaluating the options). Predictions based on strict rules are challenging since human behaviour is typically reactive rather than proactive (Oprean, 2014). However, it is difficult to quantify the impact that a decision will have on the individual which is studied through behavioural finance.

### **Behavioural Biases**

In the world of behavioural finance, the investing decisions of human are subjected to some cognitive heuristics. Some of the major behavioural biases found over the years by various authors are grouped as follows:

- **Herding** In the financial market, the herding effect is defined as the propensity of investor behaviour to imitate that of other investors. Herding is crucial in academia because asset pricing theories view it from the perspective that its variables can have a large impact on stock prices (Tan et.al. 2008). Almansour (2015) and Almansour (2017) define it as a circumstance in which rational investors frequently behave irrationally by copying the opinions of others while making such investment selections.
- **Heuristics**, according to Ritter (2003), heuristics is defined as the rules of thumb, which could make decision making in uncertain environments easier by reducing the complexity of assessing probabilities and predicting values to simpler judgments (Kahneman & Tversky, 1974). Almansour (2017) provided a foundation for the notion of confined investor rationality, which contends that in the face of uncertainty, investors' decision-making is impacted by easy-to-understand norms like heuristics.
- **Prospect theory**, Kahneman and Tversky established the prospect theory in 1985, and it describes how investors handle risk and uncertainty. Prospect theory essentially explains the apparent consistency in human behaviour when it comes to risk assessment under uncertainty. The framing effect, which relates to how people use their mental accounting when solving a problem, can also have an impact on people's decisions. In other words, investors commonly substitute experiences or intuition for logical judgement when they are unable to make decisions in accordance with rational hypotheses (Kahneman & Tversky, 1992)
- **Familiarity**- familiarity bias is linked regarding how conservative bias affects investment decisions. Once their preconceived notions are formed, people find it difficult or

slow to change their minds (Shefrin 2002). The (Barberis et al. 1998) model demonstrated this Investors with a conservative inclination would be more likely to to change their opinions slowly, as evidenced by systematic inaccuracy of selecting an investment. They consequently underreact to new knowledge.

- **Overconfidence:** People have the tendency to overestimate the accuracy of their forecasts, their belief and ability. Overconfidence suggests that investors overestimate their ability to predict market phenomenon, and because of this they often bear risk without getting proportionate returns. Psychological studies showed that, although people may differ in their magnitude of overconfidence, almost every investor displays it to some extent. This type of behaviour prevails in all categories of professionals (Barber & Odean, 1999).
- **Representativeness:** Representativeness refers to the tendency to form judgements based on stereotypes. It is also referred as drawing conclusions from very less amount of data (Shefrin, 2000). Representativeness refers to the habit of evaluating how likely something is with reference to how closely it is resembling to other something rather than using probabilities.

## Literature Review

The study focuses on six prominent behavioural biases which are herding, heuristics, prospect theory, familiarity, overconfidence, representativeness that influence the investment decision-making process. However, several studies focused on impact of few biases on the individual decision.

Some researchers found that overconfidence has negative impact on investment decisions (Oprean (2014); Bakar and Yi (2015)). While in representativeness bias, Irshad et al (2016) concluded that it has positive effect on the financial decisions of investors. Galariotis et al (2016) checked the impact of herding behaviour and Geetika and Singh (2019), have found little evidence of herding bias' influence on the way individual investors make decisions, as well as some evidence to the contrary. In contrast to Bakar and Yi (2015), who find a considerable influence, Shah et al. (2012) establishes a negative effect on availability bias. The findings of Kengatharan and Kengatharan 2014 indicate that herding, heuristics, prospect, and market are the four behavioural aspects that have a moderate impact on individual investors' investing decisions, whereas anchoring has a large influence and stock selection has a low influence. According to Bakar and Yi's research, herding behaviour has no observable influence on investors' decision-making, although overconfidence, conservatism, and availability bias do. Additionally investors risk-taking behaviour is affected by prospect factors(Almansour & Arabyat, 2017) . Prospect theory is evident in explaining the behaviour of institutional investors (Javed and Marghoob 2017), (Ogunlusi and Obademi 2021). Prospect theory has a considerable effect on investment decisions in the cryptocurrency market (Almansour,2020). Heuristics has significant influence on investment decision making process (Almansour & Arabyat, 2017), (Ogunlusi and Obademi 2021). Heuristics have a significant effect on investors' investment decisions in the cryptocurrency market (Almansour,2020). The familiarity

bias factors do not significantly affect risk-taking behaviour in investment (Almansour & Arabyat, 2017).

## Research Methodology

The study was conducted using the scale developed by (Almansour & Arabyat, 2017) through academic research. The study period was between January and August 2022. Questionnaire is floated online from which 107 responses are received out of which 80 responses are used for

the study after refining the data. The population of this study was all investors in the India, while the target population comprised of investors who invest in stock market. These investors were chosen because they have the key role on purchasing and selling securities in the Indian Stock market. The survey relates to a sample of individual investors, distributed throughout the national territory, composed of all socio-professional categories and of different levels of education and belonging to different age categories.

**Table 1 Hypotheses of the Research**

<b>H</b>	<b>Hypothesis</b>
H1	There is a significant relationship between herding and investment decision.
H2	There is a significant relationship between heuristics and investment decision.
H3	There is a significant relationship between prospect theory and investment decision
H4	There is a significant relationship between familiarity and investment decision
H5	There is a significant relationship between overconfidence and investment decision
H6	There is a significant relationship between representativeness and investment decision

**Findings and Interpretation**

**Respondent Profile**

Personal information of respondents as per their gender, age, education level, experience in years of trading at the stock market is shown in Table 2

**Table 2 Profile summary of investors**

	<b>Criteria</b>	<b>N</b>	<b>%</b>
<b>Gender</b>	Male	39	48.8
	Female	41	51.2
	Total	80	100.0
<b>Age</b>	Younger than 30	30	37.5
	31-40	17	21.3
	41-50	21	26.3
	More than 50 years	12	15.0
	Total	80	100.0
<b>Education</b>	Secondary School	11	13.7
	Bachelors	24	30.0
	Masters	30	37.5
	PHD	15	18.8
	Total	80	100.0

<b>Investment Experience</b>	Up to 1 year	23	28.7
	2-3 year	16	20.0
	4-5 year	16	20.0
	More than 5 years	25	31.3
	Total	80	100.0

As shown in table 2 age wise both the genders are cautious towards investment decision making. Descriptive of age shows that there are more investors in the sample which are younger than 30 which shows the inclination of young generation towards investing. Education wise classification indicates more number of masters in the sample and investors with more than 5 years of investing experience are also more in the sample.

**Level of impact of behavioural biases on investment choices**

The values of the sample mean of each variable were obtained in order to investigate the levels of influence that behavioural biases have on investing decisions. Since there were five levels to the Likert scale, the level of satisfaction was calculated from the score of the responses as follows:

$$\begin{aligned} & \text{(High score – Low score) / Number of levels} \\ & (5 – 1) / 5 \\ & = 0.80 \end{aligned}$$

A five-point Likert scale was used in this study to quantify the impact of behavioural biases on investment decisions. The impact of these biases on investment decisions can be determined by the value recorded by the mean of the behavioural biases. By examining the Table, which demonstrates the criteria for comprehending the means of satisfaction levels, it is possible to determine the levels in this study.

**Table 3 Criteria for Determining Means of Satisfaction Levels**

<b>Mean Score</b>	<b>Impact Level</b>
1.00 – 1.80	Very low impact
1.81 – 2.60	Low Impact
2.61 – 3.40	Moderate impact
3.41 – 4.20	High impact
4.21 – 5.00	Very high impact

As shown in the table, the impact level of behavioural biases on investment decisions were studied by applying descriptive statistics. Table 4 shows the descriptive statistics for behavioural biases used in this study.

**Table 4 Descriptive statistics**

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Impact Level</b>
<b>Herding</b>				
Her 1	80	3.35	1.008	Moderate impact
Her 2	80	3.33	1.016	Moderate impact
Her 3	80	3.41	1.002	High impact
Her 4	80	2.99	1.056	Moderate impact
<b>Heuristics</b>				
HEU1	80	3.95	.778	High impact
HEU2	80	4.10	.722	High impact
HEU3	80	3.56	.869	High impact
<b>Prospect theory</b>				
PROS1	80	3.64	.846	High impact
PROS2	80	3.46	.810	High impact
PROS3	80	3.81	.748	High impact
PROS4	80	3.32	.759	Moderate impact
PROS5	80	3.93	.689	High impact
<b>Familiarity</b>				
FAM1	80	2.73	1.009	Moderate impact
FAM2	80	4.03	.816	High impact
FAM3	80	3.58	.794	High impact
FAM4	80	3.28	.851	Moderate impact
<b>Overconfidence</b>				
OVER2	80	3.12	.806	Moderate impact
OVER3	80	3.76	.851	High impact
OVER4	80	3.41	.809	High impact
REP1	80	3.81	.828	High impact
REP2	80	3.60	.795	High impact

REP3	80	3.79	.652	High impact
REP4	80	3.53	.849	High impact
Investment decision				
INV1	80	3.40	.722	Moderate impact
INV2	80	3.74	.868	High impact
INV3	80	3.77	.779	High impact
INV4	80	4.00	.822	High impact
INV5	80	4.00	.853	High impact
INV6	80	4.12	.773	High impact

The level of impact of behavioural biases on investment decisions is shown in the table above which has significant conclusions. In herding it shows a moderate level of impact on investment decisions it can be inferred that investors generally rely on other investors decisions while taking their own investment decisions. In heuristics, it shows high level of impact from which it can be concluded that investors depend on rule of thumb and easy information while taking financial decisions. In prospect theory it is clearly seen that there is high level impact of it on investors decision making which infer that they are influenced by frame dependence which says that they will be risk taker if there is a prior gain and risk averse if there is prior loss. Discussing about overconfidence, it also has a high-level impact on investment decisions which means that while taking decisions investors tend to have a feeling of having sufficient knowledge about market and outperforming it in any situation.

Considering last bias of the study, representativeness has a high impact which shows that investors are highly influenced by previous information which they think it might help them in taking good investment decision.

Investment decision has a high impact which means that investors tries to workout all pros and cons as per the need of situation and they try to avoid being bias while taking decision.

### Correlation result

		<b>HER</b>	<b>HEU</b>	<b>PROS</b>	<b>FAM</b>	<b>OVER</b>	<b>REP</b>	<b>INV</b>
<b>HER</b>	Correlation Coefficient	1.000	.299**	.290**	.226*	.224*	.146	-.002
	Sig. (2-tailed)	.	.007	.009	.046	.047	.203	.984
	N	80	80	80	79	79	78	80
<b>HEU</b>	Correlation Coefficient	.299**	1.000	.422**	.081	.178	.217	.391**
	Sig. (2-tailed)	.007	.	.000	.477	.117	.056	.000
	N	80	80	80	79	79	78	80
<b>PROS</b>	Correlation Coefficient	.290**	.422**	1.000	.280*	.304**	.121	.318**

	Sig. (2-tailed)	.009	.000	.	.012	.006	.292	.004
	N	80	80	80	80	80	80	80
<b>FAM</b>	Correlation Coefficient	.226*	.081	.280*	1.000	.285*	.232*	.312**
	Sig. (2-tailed)	.046	.477	.012	.	.011	.041	.005
	N	80	80	80	80	80	80	80
<b>OVER</b>	Correlation Coefficient	.224*	.178	.304**	.285*	1.000	.036	.137
	Sig. (2-tailed)	.047	.117	.006	.011	.	.754	.228
	N	80	80	80	80	80	80	80
<b>REP</b>	Correlation Coefficient	.146	.217	.121	.232*	.036	1.000	.269*
	Sig. (2-tailed)	.203	.056	.292	.041	.754	.	.017
	N	80	80	80	80	80	80	80
<b>INV</b>	Correlation Coefficient	-.002	.391**	.318**	.312**	.137	.269*	1.000
	Sig. (2-tailed)	.984	.000	.004	.005	.228	.017	.
	N	80	80	80	80	80	80	80

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

\* . Correlation is significant at the 0.05 level (2-tailed).

As shown in Table correlation results shows positive relationship within the variables considered here. All the variables except herding is positively correlated with the dependent variable that is investment decision. Herding is positively correlated with heuristics ( $r = .299$ ,  $p < 0.01$ ), prospect theory ( $r = .290$ ,  $p < 0.01$ ), familiarity ( $r = .226$ ,  $p < 0.01$ ), overconfidence ( $r = .224$ ,  $p < 0.01$ ). Heuristics is positively correlated with herding ( $r = .299$ ,  $p < 0.01$ ), prospect theory ( $r = .422$ ,  $p < 0.01$ ) and investment decisions ( $r = .391$ ,  $p < 0.01$ ) whereas there is positive but weak correlation with other variables. Considering prospect theory, it has positive relationship within all the variables except representativeness which has weak positive correlation. The correlation result of familiarity shows good positive relationship within all the variables except heuristics which has weak positive correlation. Overconfidence has positive correlation with herding ( $r = .224$ ,  $p < 0.05$ ), prospect theory ( $r = .304$ ,  $p < 0.01$ ), familiarity ( $r = .285$ ,  $p < 0.05$ ) while heuristics, representativeness, investment decision has positive but very weak positive correlation. Representativeness has good correlation with only familiarity ( $r = .232$ ,  $p < 0.05$ ) and investment decision ( $r = .269$ ,  $p < 0.05$ ). However, investment decision has a negative correlation with herding and positive correlation with other variables.

### Hypothesis testing summary

H	Hypothesis	Results
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H1	There is a significant relationship between herding and investment decision.	Rejected
H2	There is a significant relationship between heuristics and investment decision.	Accepted
H3	There is a significant relationship between prospect theory and investment decision	Accepted
H4	There is a significant relationship between familiarity and investment decision	Accepted
H5	There is a significant relationship between overconfidence and investment decision	Accepted
H6	There is a significant relationship between representativeness and investment decision	Accepted

## Conclusion

Behavioural finance has found its place as a new area because of the demerits presented in traditional finance and is continuously growing with having more than 140 biases studied and being researched in present time. The study showed high level of impact of behavioural biases on investors and showed significant relationship among the biases and investment decisions except herding. Based on the study, we conclude that if investors consider the biases proposed by behavioural finance theories while taking investment decisions, their decisions will be optimal that will consequently increase their interest in investing. By doing proper analysis on biases, the investors can improve their decision which will help them in minimising the errors while making investment decisions. The study is concluded with a statement.

***“The investor’s chief problem-and his worst enemy is likely to be himself. In the end, how your investments behave is much less important than how you behave.”***

***–Benjamin Graham***

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# Sustainability Factors of Non Governmental Organisations (NGOs)

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## **Abstract**

*The phrase ‘Sustainability’ has gained popularity over the last few decades in commercial development, social sector research, and policy-oriented research. It is the trait that ensures a venture’s success with the most organisation. The word ‘Sustainability’ which is used in many different contexts, has entered our everyday vocabulary. The continuation of project operations and the preservation of project outcomes after the initial/primary grant has ended are all that the term ‘Sustainability’ means in the eyes of donors and NGOs. Most donors are worried about the long-term sustainability of a project, and they frequently support initiatives that have a clear sustainability strategy in place. It can be challenging for NGOs to maintain a steady flow of funding for their projects and programmes. In this review, we will look at the most significant factors that affect a non-governmental organization’s ability to survive.*

## **Keywords**

Role of NGOs, Stakeholders, Sustainability, Accountability, Responsibility, Civil Society, Donors, Governing Board, Resource mobilization, Demand driven projects, Fund mobilization & Need based projects.

## **Background & Introduction**

An NGO is a non-profit, volunteer organisation that is legally established, structured, and run at the local, national, or international level (NGO). They are task-oriented and led by individuals with a similar interest. Some are concentrated on particular subjects like human rights, the environment, health, eradicating poverty, rehabilitation, and employment. NGOs are now approaching social issues from a developmental, participatory, and rights-based perspective. Non-governmental organisations (NGOs) are now at the forefront of development efforts as a result of the rise of neoliberal economic policies and the state's retreat from essential sectors like health, education, and social security.

In the areas of social development planning, strategic social investment (in health & education), and management of flagship / development programmes, NGOs provide advice to governments and international / intergovernmental bodies. NGOs are frequently project-based, expertly managed, and financially supported as private aid organisations. They are intended to meet a gap in government services. NGOs, on the other hand, recently increased their influence over political and public policy.

Based on their goals and level of involvement, NGOs are divided into a wide variety of categories. Based on their focus, NGOs are categorised as service-oriented, development-oriented, empowerment/rights-oriented, or network/support-oriented. Depending on how cooperative they are, NGOs are categorised into three groups: community, regional/state, and national/international.

The establishment of information, education, and communication (IEC) programmes that support healthy behaviour is frequently spearheaded by NGOs. Additionally, a lot of NGOs have the organisational adaptability to meet shifting community needs. As donor funding declines and initiatives continue to hire NGOs for services, financial independence, effective administration, and quality control are more important than ever. Non-governmental organisations (NGOs) need to have the capacity to function well over time and on their own. A successful and sustainable NGO will have a flexible and responsive organisational structure, an independent board of directors, and a motivated, qualified, and fairly compensated workforce.

Many developing nations are coming to terms with the fact that the state cannot provide all of the goods and services necessary to end poverty and guarantee the long-term development of its citizens. As a result, non-governmental organisations (NGOs) are playing an increasingly active and complementary role in harnessing people's potential for national development as governments in many developing countries come under increasing pressure to address the needs of their citizens (Lekorwe and Mpabanga, 2007). As a result, over the past ten years, interest in and support for NGOs has grown in many developing countries. Governments were argued to be less flexible, adaptable, and quick to respond to people's needs than non-governmental organisations (NGOs) (Lekorwe and Mpabanga, 2007<sup>1</sup>). For long-term development, they could also affordably and effectively deliver higher-quality social services and programmes to the world's poorest people (Clark, 1991; Fowler, 1988<sup>2</sup>).

Surprisingly, as the NGO sector has grown in importance, there has been a demand for more accountability and evidence that they can have a significant impact on national development. Lack of skilled workers, insufficient funding, having short-term goals, giving in to political pressures, and corruption are just a few of the problems that NGO's have been linked to in the majority of developing countries (Schiampo-Campo and Sundaram, 2001; Shastri, 2008<sup>3</sup>). Schiampo-Campo and Sundaram (2001), for instance, claimed that not all NGOs have the resources or expertise necessary to effectively manage all of their programmes, let alone win the support of the local population. These alleged flaws pose a serious threat to the organisational sustainability of numerous local NGOs in developing nations. That is, the non-governmental organisations' (NGOs) capacity to withstand internal and external forces that affect their survival and ability to operate (Broekhuis and Vos, 2003; Geelsa, 2010<sup>4</sup>).

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<sup>1</sup> [https://www.researchgate.net/publication/228379806\\_Managing\\_Non-Governmental\\_Organizations\\_in\\_Botswana](https://www.researchgate.net/publication/228379806_Managing_Non-Governmental_Organizations_in_Botswana)

<sup>2</sup> <https://www.sciencedirect.com/science/article/abs/pii/S0305750X9400147Q>

<sup>3</sup> <https://www.emerald.com/insight/content/doi/10.1108/03068291211214190/full/html>

<sup>4</sup> <http://www.sintesys.cl/assets/org-sustainability2.pdf>

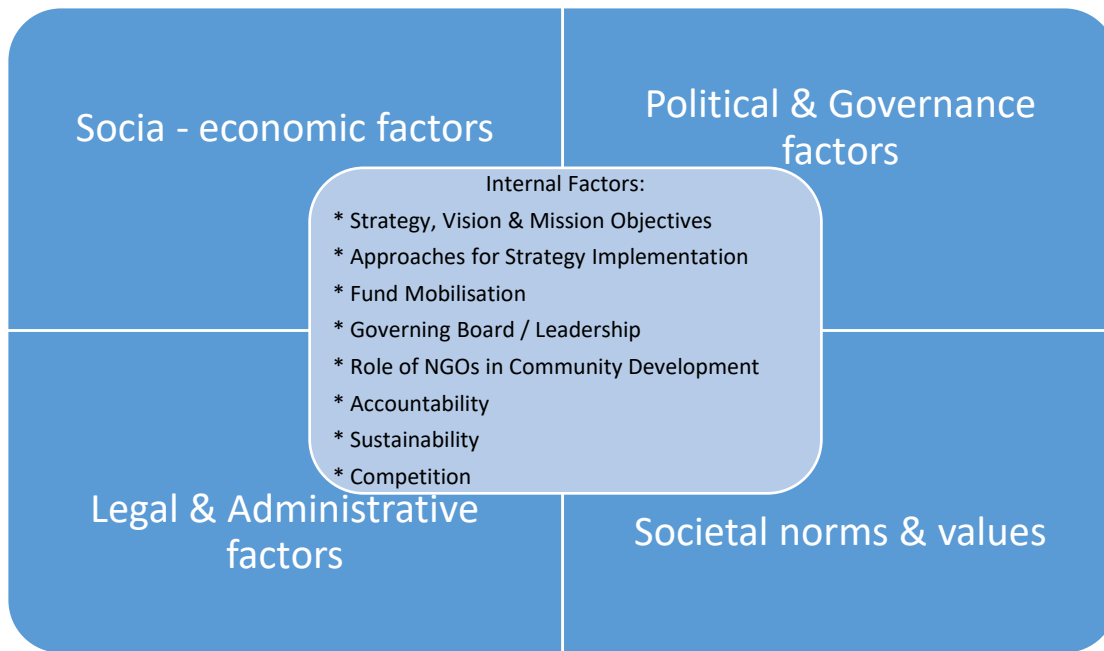


Figure – 1: Factors influencing Sustainability of NGOs.

A. Strategy; Vision & Mission; Objectives

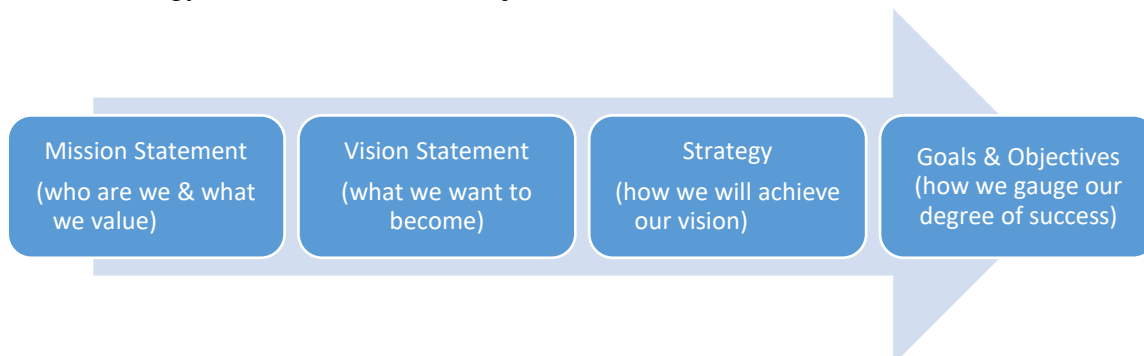


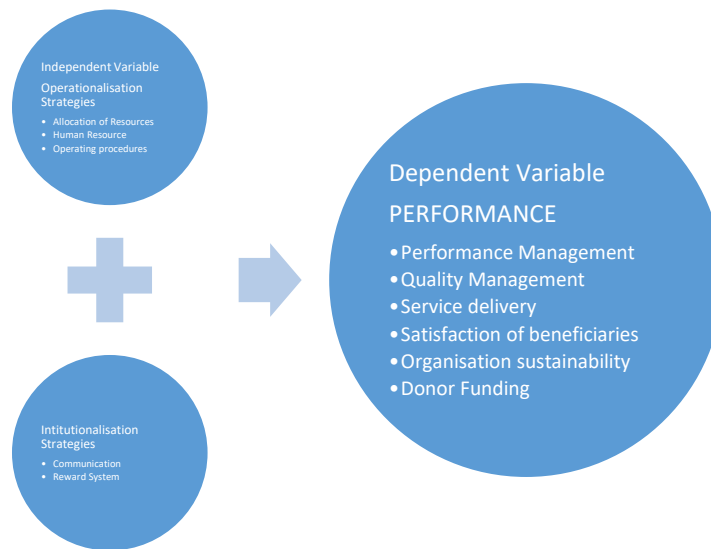
Figure – 2: Strategy; Vision & Mission; Objectives

A broad declaration that explains how you plan to achieve your goals is referred to as a mission statement. Strategies are a collection of tactics for achieving the mission and vision. Goals are statements of what must be achieved for the plan to be carried out. The term "objectives" refers to particular actions and completion dates for completing the goal.

Despite being widely acknowledged for its significance, relatively little empirical research has been done on strategy documents, particularly Mission or Vision statements, according to Steven et al. In order to determine how many different concepts could be found and which ones were most frequently used, he used content analysis to examine a database of 489 organisational statements from 300 different companies. Different uses of the same term within a single sentence could convey multiple meanings, so utterances were carefully scrutinised. The results demonstrate that a variety of phrases are used to describe the thoughts contained in such utterances, even though traditional titles are most frequently used to denote them. Due to the abundance of themes they contain, many organisational statements are particularly complicated.

Jerry Allison and his team found in their research that there is only one significant correlation between a particular kind of mission statement and a particular kind of vision statement. Though not as many as anticipated, specific connections between different types of mission and vision statements have been found. The absence of a connection between a company's mission and vision statements demonstrates that the two are not always strategically combined, and that such a connection may not produce performance synergies. In fact, this article demonstrates that organisations that use Spatially Oriented vision statements perform better when there is a strong connection between their mission statement and their vision statement.

## B. Approaches for Strategy Implementation



*Figure – 3: Approaches for Strategy Implementation*

The process of putting an organization's strategy into practice is referred to as strategy implementation. The process of putting an organization's strategies into action through a variety of procedures, plans, and programmes is known as strategy implementation. The actions and tasks that follow the creation of a strategy are referred to as its implementation.

Management has an impact because it is in charge of creating the strategies used during the implementation stage. The development of an organisation depends on the successful implementation of a strategy, but a plan's ineffective implementation could have unfavourable effects.

The results of Mr. Ramadan's study indicate that strategy implementation drivers have a big impact on the success of NGOs' initiatives. He also suggests that NGOs that want to increase the project success rate think about the factors that will drive strategy implementation.

According to Michael's research, NGOs asserted that established organisational procedures, management abilities, personnel training, and financial resources had all contributed to the Executive Director's leadership's tremendous success in plan implementation. Therefore, it is

clear that in order to fulfil their missions, all NGOs need strong leadership, management abilities, high-quality employee training, and adequate financial resources. As they are all equally important in the successful implementation of a strategy, structure, culture, and incentive policy should all be taken into consideration.

### C. Fund Mobilisation



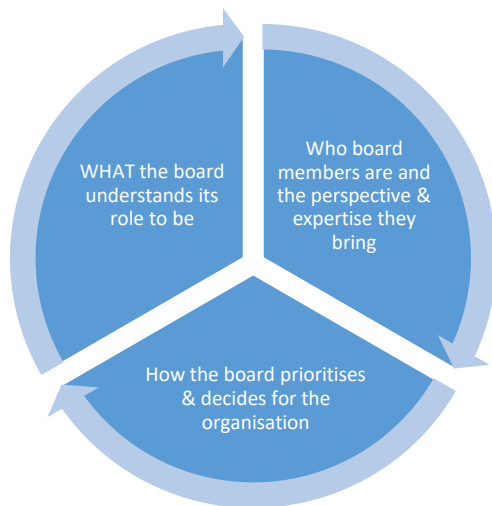
*Figure – 4: Independent & Dependent variables of Financial Sustainability*

Different development project ideas, methodologies, and processes use the creation of a Civil Based Organization (CBO/NGO) as a "model". CBOs frequently appear, grow, and stabilise over the course of a project's life cycle. However, the CBOs face a number of difficulties in carrying on once the financial support, which typically covers a portion or all of the project costs, ends. Because of this, many of these organisations are no longer around.

However, this is changing. NGOs and civil society still play a significant role in financing sustainable development. Not everyone has access to domestic resource mobilisation and foreign commercial flows, despite their rapid growth. For those in danger of falling behind, the resources, skills, and knowledge provided by non-governmental organisations are essential.

According to Ebenezer's article, the financial viability of NGOs is significantly influenced by financial management techniques, own income creation by NGOs, income diversification, and successful donor relationships. Despite being statistically insignificant, the use of cloud accounting and ERP systems had a positive impact on the financial viability of non-profit organisations.

### D. Leadership / Governing Board



*Figure – 5: Role of Governing Board of NGOs*

NGOs have a board of directors, which is made up of people chosen to ensure that the organisation stays true to its mission and to provide management with advice. The majority of NGOs select their board of directors based on the individuals' dedication to and impact within the communities they work with, as well as their knowledge of crucial subjects and potential network connections to maximise the organization's impact.

An NGO board's responsibilities include ensuring that the organization's mission and vision goals are consistently attained, conducting regular performance reviews to ensure viability and sustainability, and offering the Chief Executive Officer and other senior management the necessary networking, advice, and other support.

You should make sure that sound governance policies are in place in addition to defining and establishing board member responsibilities because they act as standards for the organization's best practices and hold board members accountable for their actions. All employees and management should have access to these policies, and they should be documented in writing with members' signatures and commitments properly documented. Moreover, the policies should outline the repercussions for each violation.

After establishing board roles and policies, users must regularly assess their organization's performance to increase effect and efficiency. Comparing current outcome data and cost-effectiveness to prior outcomes is a good way to assess staff performance. You will gain a better understanding of how to respond and exhibit openness and restraint to impress donors, funders, employees, clients, and volunteers by comparing your organization's performance to that of others in comparable circumstances.

A direction for NGOs will be determined by the trustees' or the board of directors' leadership. Strong governance will enable their NGOs to positively influence society through their work. As a result, it's critical to select like-minded and service-oriented individuals for non-governmental organisations' boards of directors. NGOs will be guided in the right direction by

the board members and their leadership, which will lead to improved NGOs' accountability and a positive impact on society.

Yi Wang's research suggests that there may not be a direct link between board leadership structure and effectiveness. Additionally, he argues that certain types of associated, executive, or independent chairman are advantageous while others are not.

Despite the board's enormous societal importance, understanding of the board and its behavior is limited (Sven-Olof Collin, 2008).

#### E. Role of NGOs in community Development



*Figure – 6: Role of NGOs in Community Development*

Non-Governmental Organizations (NGOs) have grown in importance in the development of communities, and the global attention they have received has made them indispensable in the contemporary political, social, and economic climate, as well as the world at large. Through capacity building, NGOs improve community capacities such as the ability, skill, and knowledge of organising resources, planning and analysing community actions, and addressing problems so that they may gain mastery over their life. It also invites community members to participate in the projects and assist them in improving their quality of life. Participants will be expected to plan community events, conduct meetings, and participate in community projects. In this approach, NGOs contribute to long-term community development. Non-governmental organisations (NGOs) also work to empower communities to become self-sufficient. It aids communities in recognising and depending on their own resources. Finally, this study illustrates how the programmes and roles of all of these NGOs can contribute to long-term community development.

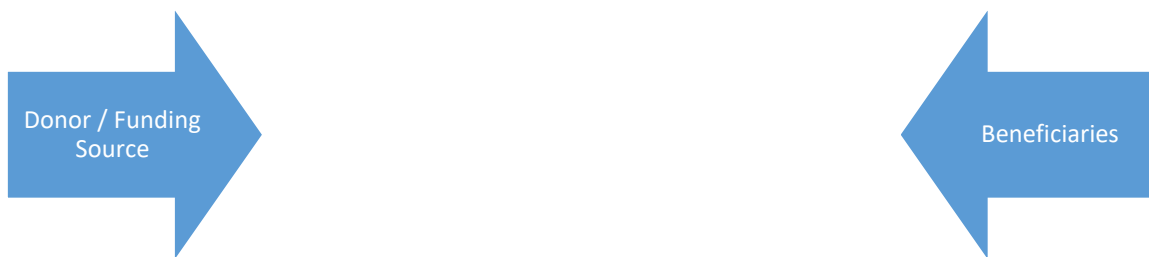
NGOs rose to prominence on the basis of their strengths as local, grassroots-level development organisations offering the potential for innovative bottom-up agendas reflecting the needs and wants of local communities and disadvantaged people. NGOs rose to prominence on the basis of their strengths as local, grassroots-level development organisations offering the potential for innovative bottom-up agendas reflecting the needs and wants of local communities and disadvantaged people. NGOs were considered as more than just alternative service providers because of their deep grassroots relationships; they also offered a path to empowerment by empowering communities and disadvantaged groups to communicate their needs in programme design and implementation. However, early perceptions of NGOs as "heroic" organisations



have been overtaken by an understanding of their more professional and depoliticized nature, as well as their limits in driving long-term structural change.

In his study, Sanchez<sup>5</sup> points out that, in addition to dealing with shortages created by underdevelopment, the effectiveness of their efforts will be determined by their ability to overcome long-standing mistrust and support the adoption of policies that integrate global and community objectives.

#### F. Accountability



*Figure – 7: Factors pre dominantly influencing an NGO's Accountability*

In the search for democratic alternatives to the country, accountability has recently come to be recognised as one of the most crucial strategies. Politicians are currently debating the need for increased accountability in global governance, but it's important to note that the term's meaning is more constrained than its application. The intellectual underpinnings of the term accountability, including its potential and constraints in promoting democracy, as well as how accountability of actors and processes of global governance might be enhanced, must be addressed if the discussion is to have significance in addition to practical relevance.

As non-governmental organisations (NGOs) take on more responsibility for providing development assistance and political counter-power, there is increased scrutiny and demand on them to show that their resources are being used effectively, transparently, and efficiently utilised. Their credibility in allocating aid funds is intrinsically tied to their responsiveness to their constituency (and the general public), commitment to their mission, operational transparency, and effectiveness in fulfilling their mandate.

Due to the fact that most countries only have very basic legal requirements for the formation and operation of NGOs, NGO accountability is primarily enforced through self-regulatory mechanisms and internal rules and procedures, which must be carefully evaluated in terms of their effectiveness in managing corruption risks. The governance framework and standards of the organisation, as well as its independence, integrity principles/codes of conduct, openness requirements, financial management standards, human resource management guidelines, and downward accountability procedures, are all assessed.

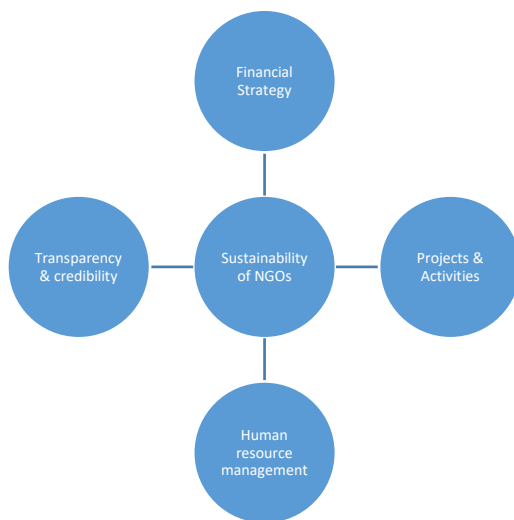
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<sup>5</sup> <https://www.jstor.org/stable/44258739>

According to Mr. Brown<sup>6</sup>, the idea of duty isn't fixed in stone. There is no one accountability framework that is suitable for all organisations, and the authors draw the conclusion that a leader of an INGO who inherits the accountability system of a policy impact INGO will find it difficult to maintain a focus on service delivery. The current accountability structure will tend to embed the organisation in its political work, which will hinder its efforts to provide services. In this regard, accountability must be consistent with the overall strategy of the business

The current debate over NGO accountability, according to Mr. Anderson's<sup>7</sup> research, centres around fundamental issues and ideas, conventional solutions like the law, best practises, and donor regimes, consideration of accountability in particular country contexts, and futuristic approaches to NGO accountability. He goes on to say that since the underlying motivations have not changed, the representational and democratic disputes over NGOs will still exist. The discussion of global governance is not distracted by this, nor should it be. The objective is to do study and learn more about how to produce meaningful accountability in ways other than representativeness.

## G. Sustainability



*Figure – 8: Other Sustainability factors of NGOs*

Sustainability, from the perspective of an NGO, refers to continuing to carry out and provide project benefits to the main target population after donor funding have run out. To put it another way, sustainability refers to the maintenance and continuation of your activities after the funding period has ended.

It's critical to acknowledge that long-term planning is necessary for sustainability in order to promote broad donor engagement and develop the institutional capacity of the target

<sup>6</sup> <https://journals.sagepub.com/doi/abs/10.1177/0899764001303012>

<sup>7</sup> <https://www.cambridge.org/core/journals/american-journal-of-international-law/article/abs/what-ngo-accountability-meansand-does-not-mean/7EACDC2396C758666883FC229AF8EE6A>

population. Sustainability planning is essential for organisations because it equips them to produce extraordinary results even in the absence of primary funding.

When creating your organization's sustainability plan, you should take a variety of sustainability issues into consideration. You should consider your organization's programming, organisational, and financial sustainability as a non-profit.

According to the evaluations on the questionnaires in the project conception section, Rono's<sup>8</sup> study revealed that the NGO's general leadership is involved during project conceptualization, however the degree of involvement varies. The majority of NGOs had strict accounting procedures in place, which was the second outcome. However, controls, particularly control over project assets, needed to be strengthened. Finally, a range of financial sources are used by non-governmental organisations (NGOs) to support their operations. The poll also revealed a high dependency on external finance, a low use of internal resources, and a failure to fully utilise the service provided in order to provide a respectable return. The research showed that NGOs include their employees in project design through their leaders and that NGOs lacked adequate control systems, especially in relation to project assets. Additionally, it was found that there was a heavy reliance on outside funding and that there was little effort put into offering project services at market rates to create long-term revenue streams. In light of this, it was determined in general that project conceptualization, financial systems, and funding had an effect on the long-term viability of NGO development programmes.

In order to explain bureau survival, Besel's<sup>9</sup> research tries to go beyond a straightforward association between two factors, namely budget size and bureau survival. It emphasises how keeping good working connections with government representatives affects an organization's long-term existence.

## H. Competition

The perception of each non-governmental organisation is that it is distinct from the others. Every non-profit organization's "entrepreneur" has a different idea of how development should be carried out. Despite the fact that mergers between businesses are frequently motivated by profit, NGOs rarely do so. This emphasises that non-governmental organisations (NGOs) are mission-driven organisations whose founders are passionate about maintaining their goals. With the idea that each NGO maximises the impact of its particular purpose, these ideas served as the foundation for our methodology.

Every NGO prides itself on being distinct. Every "entrepreneur" who runs a non-profit organisation has a different idea of how development ought to be carried out. NGOs rarely merge, in contrast to mergers driven by business profitability. This emphasises that non-governmental organisations (NGOs) are mission-driven organisations whose founders are passionate about maintaining their aims. We based our technique on these elements with the idea that each NGO maximises the impact of its specific objective.

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<sup>8</sup> <http://thesisbank.jhia.ac.ke/3765/>

<sup>9</sup> <https://www.proquest.com/openview/90acb46fb92d511603bf1b4cd5b8528c/1?pq-origsite=gscholar&cbl=18750&diss=y>

What part does competition play here? Every NGO makes an effort to convince sponsors that its initiative is better than that of other NGOs. Even the most dedicated individuals fall short occasionally; an hour spent creating and distributing appeal letters does not equate to an hour spent immunising sick children. The most significant resource for an NGO is its members' time, which must be divided between carrying out the purpose and raising money.

Different donors hold different opinions about the importance of different development areas. The likelihood that a donor will give to an NGO increases with how closely their ideologies and those of the latter coincide. A non-profit organisation uses its fundraising efforts to convince its supporters that the project it is working on is in line with their ideals.

Usually, supporting one deserving cause means disregarding another. The effectiveness of other NGOs' projects is impacted by one NGO's increased fundraising because of the competition for donors. Because of these negative externalities, there are too many NGOs in this "bad competition" paradigm, and each one's project is too little in comparison to the socially ideal number. Susan Rose-Ackerman examined the effects of charity competition and excessive fundraising in her study on the subject, which was published in 1982.

Aldasheva's<sup>10</sup> research focuses on the competition between NGOs in global markets for development donations, and he discovers that NGOs can go global if fundraising economies of scale are high enough. In this situation, national NGOs in the smaller country disappear, whilst certain national NGOs in the larger country only endure if the nations' sizes are sufficiently different. Social wellbeing is higher under the multinationals system than it is under the autarky regime.

Competition jeopardises the quality of services provided, hinders timely service delivery, discourages cooperation, and diminishes the long-term capacity of indigenous help organisations.

## CONCLUSION:

We acknowledge that in order to secure their long-term existence, non-governmental organisations must take a number of steps and measures in the area of strategic management. In conclusion, diversifying your sources of income is one of the foundations of sound financial planning. Diversification can be improved by self-financing, which is thought ideal for NGOs to achieve financial balance and subsequently long-term sustainability. The product strategy should consider not only the widening or contracting of the product line but also the enhancement of service and product quality, the potential for charging for those goods and services that are socially acceptable, as well as the option of all of these factors. As part of the marketing strategy, it is essential to promote non-governmental organisations as transparent, reliable businesses because this has a big impact on receiving funding from both internal and external sources. When NGOs responsibly carry out their missions and effectively inform the public of the influence non-governmental organisations have in the community, the public is

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<sup>10</sup> <https://www.sciencedirect.com/science/article/abs/pii/S0022199609000968>

willing to support self-financing activities and prospective commercial activities that are not necessarily related to the mission (positive social change).

It's crucial to maintain transparency and demonstrate how an organisation uses the funding it gets. The marketing strategy should be integrated with the product strategy to determine what items should be delivered, how the company should differentiate itself from the competitors, and how to increase interest in the goods and services offered.

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## Influence of HR Chatbot on employees in IT Organizations

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### **Abstract**

*The purpose of the research is to evaluate the artificial intelligence chatbots influence on employees in the organization. The author is experimenting the employee experience using the chatbot and meeting the expectations. As most of the times the employees do not receive the experience what is promised to what they use the AI for. The aim of the study is to identify chatbots impact across the organization irrespective of the departments. The study is completely based on primary data through survey method. Employees approximately 120 of them will be shortlisted through random sampling while sending the survey.*

*The paper found that artificial intelligence chatbots are very productive tools in the organization as it reduces the duplication of work for the employees to respond to the regular employee queries. Additionally, it focuses more on to resolve complex issues in the process of using the chatbot. Through the amalgamation of artificial intelligence in human resources process is increasing attention among the researchers still there is opportunity to explore in the field.*

*The paper provided future research avenues in the field of chatbots in human resources to improve the chatbot experience for the employees by updating and simplifying the chatbot for the employees.*

### **Key Words**

Artificial Intelligence, Chatbot, Employee Experience, Organization Socialization, Technology Acceptance Model(TAM)

## Impact of AI on Marketing function in enterprises.

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### ***Abstract***

*Enterprises continuously invest in Marketing functions to build a long-lasting relationships with customers and prospects to create brand awareness, and to keep them informed about products and services so that their brand is on top of their minds in the crowded marketplace. The Digital Transformation in the Marketing function with the aid of Artificial Intelligence ( AI) and convergence of technology platforms has enabled the processing of historical data and real time data from other sources to get dynamic actionable insights to communicate the right message at the right time to the target audience. AI technologies enable marketers to understand clients and prospects in a better way and target with the right campaigns at various stages of the purchase cycle.*

*This paper studies the adoption of AI in the Marketing function to analyse data, gain insights, create real-time segmentation, and make precise predictions that enable marketers to create more effective marketing strategies. The research involves exploratory research with the literature review of the existing research papers and analysis of the case studies from the enterprises. The study looks at the AI marketing solutions available either as standalone solutions or as part of the marketing suite of products of leading AI/ marketing technology solution providers. The industry trends in terms of technology adoption are analysed based on the reports available from leading industry analyst firms.*

*The study helps enterprises in understanding how AI has impacted marketing and in prioritising AI use cases which can be adopted for enhancing marketing efficiency.*

### **Keywords**

Artificial Intelligence ( AI) in marketing, Segmentation, Marketing campaigns, actionable insights, Marketing technologies

### **1. Introduction**

Progressive enterprises are adopting Artificial intelligence ( AI) solutions in their marketing functions. AI-based marketing helps enterprises to understand their customers better, improve product and service offerings, and optimise their marketing spend. McKinsey survey in the year 2020 found that Marketing & sales have the third highest rate of AI adoption. Brands need to engage with prospects and customers at a scale and AI solutions help in optimized demand generation and provide a better return on investment. As AI continues to evolve, there will be



more disruptions in marketing functions leading to sophisticated marketing strategies in the years to come.

### **1.1. Purpose / objectives**

The primary purpose of our study is to examine the state of AI adoption in the marketing function and how it has benefitted enterprises. The study was conducted using a four-step approach such as 1. Analysis of the advancements in AI/ML technologies 2. Conceptual view of how the 4 Ps of marketing mix have evolved in digital enterprises 3. Analysis of how marketing function has transformed by leveraging digital and AI technologies 4. Analysis of the AI-based marketing use case implementations and the impact on the performance of marketing function in enterprises.

### **1.2. Research methodology/ Approach**

The research process was primarily a literature review of research papers from reputed journals on the subject of AI/ML and marketing technologies to analyse and understand the current technology landscape and to define the conceptual view of AI-based marketing on the foundations of the 4 Ps of the marketing mix. Further research involved analysing the case studies from industry bodies, reports from leading analysts as well the enterprises implementing the Marketing technology stack with AI solutions.

## **2. Review of Literature**

Marketing is a key function for any enterprise involving all actions the enterprise carries out to educate, attract the target audiences and convert them as customers and maintain a long-standing relationship with them. Marketing is responsible for getting people interested in the product or the services of the Enterprise.

### **2.1. Marketing in an Enterprise context**

The marketing function in any enterprise plays a key role in boosting sales through the promotion of products or services, ensuring effective customer engagement by providing product or service information, and value addition by creating good content about products or services. Professor emeritus Philip Kotler defined marketing function as "a social process by which individuals and groups obtain what they need and want through creating and exchanging products and value with others" (Kotler, 1984). Marketing is broadly defined as an activity in which individuals or organizations are involved in the creation, distribution, promotion and pricing of various goods, and services to facilitate a beneficial relationship in a dynamic business environment. (Pride, 1991)

*The marketing function is responsible for building the brand for the enterprise by ensuring that customer expectations are met and exceeded regularly. The marketing function is primarily responsible for consumer behaviour analysis based on demographics, and psychographics to understand what customer wants and build a long-lasting relationship between the customer and the business. Marketing ensures that the business stays relevant to the customers and target market.*

*The 4-Ps of marketing mix involving Product, Price, Place and Promotion explain how marketing interacts with each aspect of business (McCarthy E. J., 1987). The 7 Ps of marketing mix emphasises the Product, Price, Promotion, People, Process and Physical evidence in the marketing actions (Bitner, 1981). Pricing the product or service competitively is an important factor. The marketing function needs to assess the competition, and demand scenario and do market research to find the right price on an ongoing basis. Pricing is one important element by which end customers judge the value of the product and impacts the brand selection amongst the available options (Lehmann, 1974). The product should uphold the enterprise's brand, fulfil the target customer requirements, should be supported during the lifecycle. It is argued that a broader product line meeting the different target consumers increases the market share and profitability of the enterprises. (Sunder Kekre, 1990). Another important aspect is place, which focuses on how the product or service is made available to customers i.e. either through physical shops, distribution channels or online channels. Promotion involves integrated marketing campaigns involving advertisements, customer education, sales promotions, listening to customer feedback, sponsorships, public relations etc. (Rowley, 1998)*

*Another important marketing model in the context of new technology advancements is the 3 stages Segmentation-Targeting-Positioning ( STP) model. STP focuses on identifying distinct customer needs and grouping them into segments. Segmentation is a process of categorising individuals or groups based on similar characteristics or needs to arrive at a sub-market in which specific needs are to be met in the market (Yu, 1991). Targeting involves which groups of audience or customers to aim for business and positioning of the product or service mix to the target audience to which it is most likely to appeal. Positioning is a process in which enterprises establish a unique position for their brand in the mind of target customers (Hsiu, 1998).*

## **2.2. Impact of technology on Marketing**

*Digital Marketing adoption: Emergence of technologies in the domains of web, mobile, and social media platforms, real-time communication enabled transformation in marketing. The growth of Social media platforms, Search engine marketing, Online advertisements such as PPC, Display advertisements, LinkedIn, Instagram, and Twitter marketing enabled the adoption of Digital marketing by many enterprises.*

Digital Marketing is a set of activities and processes facilitated by digital technologies for creating, communicating and delivering value to customers, prospects and other stakeholders. Digital marketing can be summarised as a technology-enabled adaptive marketing process in which enterprises collaborate with customers and partners to jointly create, communicate and sustain value to all external and internal stakeholders (P.K.Kannan, 2017).

Digital marketing is a set of marketing methods and the brief description of these methods is as follows.

**Social media marketing:** digital advertising through social media platforms to educate prospects on products, services, and offers. As per (Lamberton, 2016) the role of social media in Marketing has gradually evolved from a simple marketing tool to a source of Market intelligence and has become critical for marketers to strategically use social media marketing to achieve competitive advantage and superior performance in the market.

**Content Marketing:** Marketing approach in which relevant content is created, and published through digital media, generating interest amongst the audience and converting the prospects into customers in a sustained manner. Holliman and Rowley (Holliman, 2014) define content marketing as a customer-centric strategy in which useful, compelling, timely and relevant content is made available to prospects and customers.

**Search Engine Marketing:** SEM is a collection of marketing activities in performing search engine optimisation, Pay per click listings, Submitting websites for Search engine directories and developing online marketing strategies for businesses. The key factor for SEMs adoption is due to the reason that Search engines have become the main source for consumers to locate information (Rangaswamy, 2009). On-page and off-page search engine optimization of websites is a key activity, so that website ranks higher on search engines like Google, Bing, Opera etc. It involves ongoing improvements of the website content, studying keyword trends and application of SEO optimization techniques to rank higher on Search engine results.

**E-mail Marketing:** To reach prospective and existing customers with product and service offers, discount offers and special offers etc. Research findings show that successful e-mail marketing involves setting explicit objectives, appropriate metrics to measure the outcome of the e-mail marketing campaign, selecting an appropriate subject line, and relevant content in the e-mail body with CTA – Call to action elements to achieve conversions. (Martin Hudk, 2017)

**Social and Search engine advertisements:** Paid advertisements with Social media platforms and Search service providers like Google, Bing etc which appear on top of the Search results pages. The advertisements are based on the search keywords and advertisements appear on the top of the search results page when a relevant keyword is searched.

### 2.3. AI and ML technology advancement

Artificial intelligence ( AI) is a science and technology aimed at reproducing the cognitive abilities of humans objectives autonomously, taking into account any constraints that may be encountered. (Benko, 2009).

John McCarthy Et al. in their proposal defined AI as "that of making a machine behave in ways that would be called intelligent if a human were so behaving" (McCarthy, 1955). Over the years there have been major capabilities developed in AI areas such as Natural Language processing,

Neural networks, Image processing, Chatbots and Virtual assistants and has applications across industry domains. AI has been effectively deployed across various functions of the enterprises such as Sales and Marketing, Research and development, Operations and maintenance, and demand forecasting (Kuzey C. U., 2014).

AI has enabled enterprises to create new business models, adapt to changing market conditions, improve product offerings and provide better services to customers. AI, as part of an organization’s ecosystem, can have an impact, particularly on performance, on the relationships between organizations and their customers, prospects, and partners (Kelly et al., 2019; Rubin Victoria et al., 2010).

AI is a technology which mimics human intelligence through a combination of computational systems, data and advanced algorithms. AI enables machines to learn from training datasets and learn over experience and perform complex human-like tasks. AI adds intelligence to existing products and improves business processes through automation, expert decision systems, and predictive systems. AI analysis deeper data using Neural Networks and helps come out with complex analyses.

The evolution of technology has resulted in a big explosion in the amount of data generated every day. There is a large amount of structured and unstructured data generated through social media, the internet, personal assistants, IoT devices and augmented reality. Businesses have implemented Cloud computing, E-commerce, Real-time inventory, Workforce automation, Big data and real-time analytics which generate data. Households generate data through social media, personal assistants, gaming, Streaming media, wearables, home automation, surveillance systems etc. The availability of vast amounts of data along with developments of AI technology has resulted in widespread applications of AI in various areas. AI finds applications in healthcare, banking and financial institutions, gaming & entertainment, Retail & Commerce, and manufacturing.

*Table 1: AI & Machine Learning methods.*

<b>AI Type</b>	<b>ML Subtype</b>	<b>Functionality</b>
Machine learning	Supervised learning model	Supervised learning Machine learning models use labelled training data sets to train the model and learn over time. The supervised learning ML models can be classification or regression models.  Classification algorithms are linear classifiers, K- nearest neighbour, Support Vector Machines (SVM), Random forest, and decision trees.  Regression models establish the relationship between the independent variables and the dependent variables. Linear, Logistical and polynomial regression models constitute regression models. (Cord & Cunningham, 2008)
	Semi-supervised Learning model	Semi-supervised learning is a ML model in which a small amount of labelled data is combined with a large amount of unlabelled data for training. The semi-

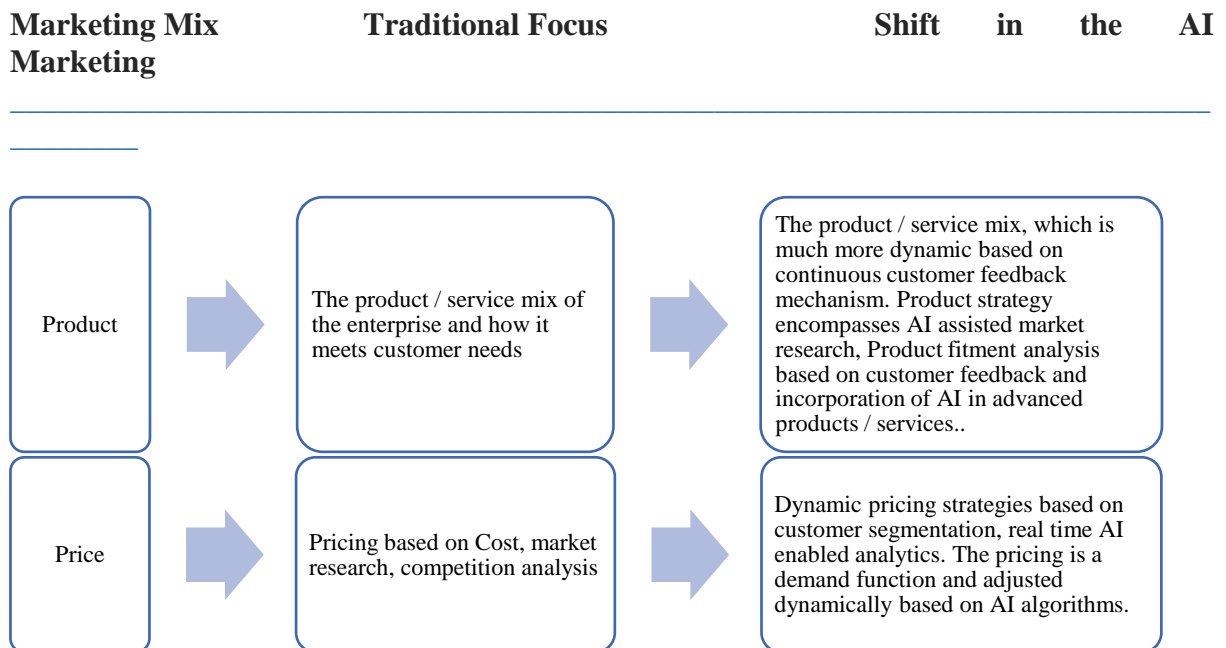
		<p>supervised learning avoids the challenges of having large amounts of labelled data. It's an intermediate ground between the supervised and unsupervised ML models.</p> <p>(Zhu, 2005)</p>
	Unsupervised learning model	<p>Unsupervised learning models learn patterns from unlabelled data. Algorithms identify the patterns and data groupings without the need for labelled data. The modelling is based on clustering, association and dimensionality reduction. The clustering mechanisms could be K-means clustering, hierarchical clustering, and probability clustering.</p> <p>(Celebi &amp; Aydin, 2016)</p>
	Reinforcement learning	<p>The Reinforcement learning models use feedback-based learning models. The ML model learns by performing actions and checking the results of actions. The model interacts with the environment and learns to act within it. The data is not labelled in the case of reinforcement learning models.</p> <p>(Sutton &amp; Barto, 2018)</p>
	Deep learning	<p>Deep learning models imitate the way humans acquire certain types of knowledge. It consists of neural networks with three or more layers, which attempt to simulate the human brain. Deep learning enables automation, and analytical tasks without human intervention. Deep learning drives products such as digital assistants, fraud detection etc.</p> <p>(LeCun, Bengio, &amp; Hinton, 2015)</p>
Natural language processing (NLP)	Natural Language Processing	<p>Natural Language Processing ( NLP) technologies provide the ability to understand human language as it's spoken and written. NLP deals with rule-based modelling of human language with machine learning and deep learning models. NLP technology enables computers to process natural language and understand the full meaning together with intent and sentiment.</p> <p>(Kaplan &amp; Haenlein, 2020)</p>
	Sentiment analysis	<p>Sentiment analysis machine learning models/ tools carry out the contextual mining of text and extract the subjective information such as opinions, complaints, suggestions, queries and appreciation about the firms' products and services.</p> <p>(Pāvāloaia, Teodor, Fotache, &amp; Danile,t, 2019)</p>
Expert systems		<p>Expert systems are AI/ML-based programs to solve complex problems and provide decision-making ability like a human expert. Expert systems use a complex body of knowledge and improve decision-making performance over time as they gain more experience.</p> <p>(Nagori &amp; Trivedi, 2014)</p>

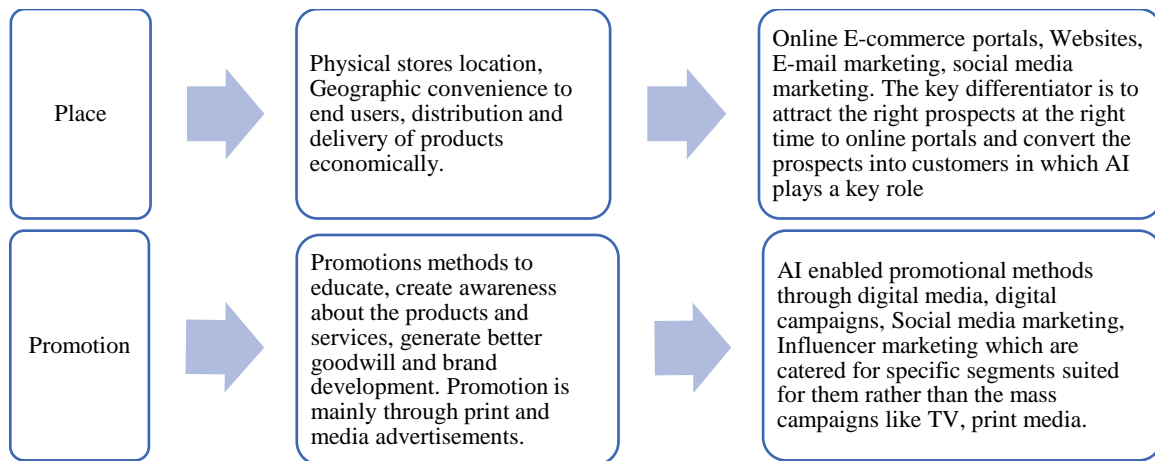
### 3. Theoretical Framework - 4Ps of Marketing mix in the digital enterprises

With the changing business environments due to technological advancements, business dynamics have changed leading to enterprises embracing digital transformation leveraging Big data, Cloud and AI. The evolution of Digital technologies and platforms has resulted in the generation of huge volumes of data at a much faster rate (McAfee, 2012). Enterprises have transformed their Sales and Marketing by creating online digital marketplaces for potential customers and providing a platform for prospects to gather information, interact with other customers, and provide feedback on the products or services. (Stone, 2014). The marketing function has undergone transformation leading to a relationship-driven and personalised approach instead of a transaction driven (Rust, 2014). AI enables enterprises to get valuable insights about consumers, engage with them through appropriate and timely offers and convert through the right promotions.

Analysing the shifting digital landscape in enterprises, we propose the conceptual view of the 4Ps of marketing in AI marketing, which helps enterprises to focus on the transformation of marketing function keeping the foundations of marketing in mind.

*Fig.1: 4Ps of Marketing mix in digital enterprises*





#### 4. AI adoption in Marketing

AI has been effectively implemented across the 4 Ps of the marketing mix bringing in multi-fold benefits. We look at the benefits of implementing AI in the marketing technology stack and how enterprises are achieving competitive advantages compared to those who are yet to adopt AI in Marketing.

Marketing technology suits are integrated with AI technology enabling the delivery of consistent digital experiences commensurate with the enterprise's brand, intelligently predicting customer behaviour through customer journey analytics, providing personalised offers and converting based on real-time pricing and promotional offers.

Using AI in marketing helps analyze vast amounts of data from multiple sources, identify patterns, and drive predictions. AI/ML algorithms are effectively used in marketing. Regression models are used for dynamic pricing. SVM – Support Vector machine predictive algorithms are used to classify customers by features and thereby create segmentations. Decision tree analysis models are used for predictive analysis in marketing. K-means clustering algorithms are applied to create categories of unlabelled data. Convolutional neural networks find use in image analysis. Text classification is used to generate user insights.

Table 2: AI & ML use cases in Marketing mix.

Marketing Mix	AI Use Cases
Product	Product recommendation systems: Advanced ML-based algorithms analyse clicks, views, browsing history of the audience, past transactions, location data, and demographic data to recommend products and services in real-time. The recommendation can be real-time when a customer is doing online shopping, or the in the search process or during the final stages of the purchase to upsell or cross-sell other relevant products.
Price	AI-powered pricing systems with advanced machine learning algorithms adjust and offer prices based on market and consumer data analysis in real-time to get more users to buy products and thereby increase sales volumes

	<p>and profits. The machine learning algorithms predict market demand dynamics and provide optimal pricing dynamically.</p> <p>ML algorithms process data about sales volumes, price points, market demand and combine the historical data and current demands and run the ML model to predict the right price point to increase conversions. There are many models based on Bayesian, Reinforcement and decision tree models which effectively provide ML-based recommender systems, which are integrated into modern marketing technology stacks.</p>
Place	<p>In the digital enterprise's context, the place is where the enterprises sell the products or services through digital channels, be it through an E-commerce storefront, brand website or mobile application. This is the place where the enterprise's prospects reach out to get knowledge and do product research to check product fitment against their needs. Users cross-check the existing customer feedback. One of the key differentiators is how you get the prospects to your online portal.</p> <p>Enterprise use AI to build creative digital ads which resonate well with users, use content AI to draft digital product brochures and ad content, and use AI-based bidding for digital ads spend optimisation. Enterprises use real-time analytics to dynamically create customer segments for targeted campaigns to attract prospective users to their websites, and commerce portals. AI is used for the smart allocation of funds to ad campaigns and bidding. AI is used for testing campaigns before launch to test the effectiveness of the campaign and predict the performance well before the launch.</p>
Promotion	<p>Content AI Efficient Product/service search through AI-powered automated tagging so that customers find relevant information about enterprise offerings, products and services.</p> <p>AI-enabled asset injection: Through digital asset management with enhanced metadata and showing the best digital asset in real time to prospects. AI-enabled product promotions for cross-selling / upselling by finding the relevant products in real-time.</p> <p>Content Automation: Automated workflows for the creation, approval and development of digital assets leading to cost savings.</p>

**Personalisation:** Marketing campaigns, and offers need to be personalised based on audience profiles and real-time inputs gathered through various online sources so that the content/offer is most relevant and will lead to conversion into deals. Customers expect enterprises to know what they want and demonstrate product/service capabilities, which fit their needs. The offers should be consistent across the marketing channels. The AI-based personalisation predicts, which content resonates well with customers.

**Lead generation:** AI algorithms identify the leads which are more likely to convert, based on existing customer data and customer journey analytics on the online channels. AI systems score



the leads based on predictive algorithms, which enable the sales team to prioritise the leads for further follow-ups and to utilise their time efficiently. AI-based lead generation and scoring reduce manual efforts to a great extent and improves sales productivity. Some of the notable AI-enabled lead generation tools are the LinkedIn Sales Navigator tool and HubSpot's Growth bot which integrates into the Marketing suite of products.

**Customer segmentation and targeting:** Segmentation is a process of creating a subset of audience profiles from a larger addressable audience in the market so that one can target with a specific offer. AI implementations achieve a unified view of customers by combining the data from multiple sources of enterprise, and third-party data sources in real time. Apart from enterprise data, major social / search platforms like Facebook, Instagram, Twitter, and Google have a vast amount of customer data which is used by the platforms for customer segmentation. AI models enable the creation of segments of audiences based on propensity scores, influential factors and past customer behaviours.

The targeting includes A/B tests to determine which promotion improves the conversion rates. Multivariate tests compare the multiple offers to determine which combination performs best for a specific segment of the audience, Automated personalisation based on AI algorithms delivers the best content specific to the target segment.

**Customer behaviour Analytics:** AI-enabled customer behavioural analysis enables marketers to collect data from all engagement channels and provide insights to understand customer behaviour on online and offline channels. Insights help marketers optimise experiences, and predict future trends. AI tools provide insights on estimated purchase values, the likelihood of a customer completing the purchase, and brand affinity. It helps understand the cause and effects of customer interactions. AI-based attribution models provide analysis of customer behaviour and understanding of outcomes. Flow and fall-out analysis provides insights into how customers explore websites/product pages. Cohort analysis creates and compares customers with similar characteristics and enables finding patterns in customer behaviour. Anomaly detection highlights irregularities and alerts the business on possible causes. Adobe Sensei AI tools, and Salesforce Einstein AI modules are some of these AI solutions.

**Promotions, and advertisements:** AI is used extensively used in promotion activities be it PPC, Display advertisements, or Search Engine Optimisation (SEO). AI enables smart bidding for digital advertisements. Google has expensive AI/ ML implementation to provide automation in Google Ads. Google Ads- Smart bidding is powered by ML algorithms with in-depth analysis. AI Algorithms consider a range of datasets to arrive at a target audience with a higher possibility of converting them. Smart bidding enables max conversions, optimises cost per acquisition ( CPA) and enhances return on spend ( ROAS). AI adjust PPC bids automatically. Responsive Search Ads ( RSAs) from Google help marketers draft a PPC Ad copy which is better.

AI-enabled SEO strategies help in automated keyword research for SEO, Automated SEO-optimised content creation, and efficient SEO workflows.

**Marketing content generation:** AI algorithms can analyse customer data and provide valuable insights about customers. The AI algorithms create content that is highly customised to customer profiles and segments. Marketing e-mails are being drafted with the aid of AI tools. Major publishers are using Natural Language Generation ( NLG) tools for content creation.

Quill Bot, Amazon Polly, and Google text-to-speech conversion tools are being used extensively. AI content creation has been extensively used for the creation of social media posts, new updates and brief reports. Advanced keyword research tools enable finding keyword trends and generating new content for marketing promotions. AI algorithms curate the UGC – User-generated content and provide customer feedback periodically.

## 5. KPIs for Quantifying the AI marketing results

How do we measure the impact and benefits of AI marketing on enterprises' performance? Below are some of the key performance indicators which provide the means to quantify the results and assess the impact of AI-based marketing on firms' performance.

5.1. Marketing qualified leads ( MQL): Marketing qualified leads are those prospects, who have shown an interest in the firms' products or services. These leads are generated through Marketing activities through personalised messages, Just in time offers, and Inbound marketing based on content AI-based smart content. The triggers for collecting these leads can be white paper downloads, Event registrations, Webinar registrations, and Product demo requests. The attribution functions can track which events and channels generated the marketing-qualified leads.

5.2. Sales Qualified leads ( SQL): The Sales Qualified leads are those which are vetted by the marketing team and are passed to the Sales team for further follow-up by the sales team. SQLs are a subset of marketing leads, which have the greater potential of conversion into an order. AI/ ML algorithms like propensity, Predictive behaviour are effectively used to identify the leads which form the sales-qualified leads. These leads are aggressively followed by the sales team for effective conversion.

5.3. Quality of the SQL: This parameter tracks the percentage of the MQLs which are accepted as SQLs for further follow-up by sales teams. The MQL leads are filtered based on a buyer profile, budget, degree of interest, and propensity for buying keeping in mind the firm's target customer segment. The quality of SQL is a critical metric for tracking marketing efforts and determining how effectively marketing channels are delivering the intended results.

5.4. Channel-wise MQL to SQL rates: Channel-wise monitoring MQL to SQL conversion rates helps in identifying which marketing channels are yielding better results and which in turn enable the firm to take decisions regarding further investment in marketing and to carry out fine-tuning and prioritising digital marketing, AIM / ML use case implementations.

5.5. Lead to customer percentage: This is the most important parameter and provides data on how effectively marketing efforts are contributing to sales and firms' growth. It helps determine the health of marketing efforts as a whole.

5.6. Average deal size: It's the average size of the sales orders of closed deals or contracts. It is one of a benchmark to compare against the industry standards.

5.7. Customer lifetime value (CLV): It's the ultimate return on the total investments the firm makes in customer acquisition activities. The higher customer lifetime value indicates customer loyalty and returning customers for repeat business.

5.8. Marketing contribution to closed revenue: It's the percentage of revenue that is generated through marketing/ Sales qualified leads which are generated through marketing efforts.

## 6. Analysis and conclusion

Conclusions: Digital technologies and a dynamic business environment have forced enterprises to implement a variety of innovative marketing strategies with the adoption of AI technology. AI-based marketing strategies are imperative to improve business outcomes, increase sales, boost customer retention and build a brand that resonates well with customers. AI is serving as a catalyst in Marketing transformation. In this exploratory research, we find that lot of new AI solutions are being developed for marketing use cases. AI adoption has increased in recent years due to the wide range of AI solutions available in the market. AI tech has become more accessible and even small enterprises are integrating AI into the Marketing tech stack. Our conceptual framework to map the 4Ps of marketing with AI-based marketing in the digital shift is a reference for organizations which are looking to adopt and enhance AI in their marketing function. Organizations must pay significant attention towards the adoption of AI in Marketing to survive in the competitive market space.

Research limitations/implications: The research agenda is exploratory in nature to understand how enterprises have adopted AI in marketing. The research is based on the study of case studies in the public domain and the AI product features in the marketing suite of products. The study focussed on enterprises across different countries and verticals. Hence our findings do not represent an in-depth analysis of AI implementation in marketing and do not ascertain the benefits of AI implementation in quantitative terms.

Agenda for future research: We propose two areas of further research to assess the impact of AI in marketing. The first research area is to undertake quantitative research by analysing the impact of AI on marketing and the firm's performance. We have discussed the quantitative parameters in section 5, which indicate improvements in the firm's performance concerning marketing key parameters.

The second research area is about the end consumers' acceptance level and perceived benefits of AI marketing in their purchase journeys and interactions with the enterprises. This research will help assess the real extent of benefits as perceived by the end consumers and provide ideas to enterprises about which AI uses cases they need to prioritise for implementations.

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## Influence of Net Promoter Score on Net Revenue Retention.

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### **Abstract**

*This Study focuses on establishing a causal relationship between the Net Promoter Score<sup>SM</sup> (NPS®) and Net Revenue Retention (NRR) of an organization. NPS is a customer loyalty metric which categorizes the customers as Promoters, Passive, or Detractor based on survey responses.*

*The Research Methodology is quantitative in nature from the population base of all active customers of an organization.*

*If the theory behind NPS is valid, a statistically significant difference between Churned Customer NPS and NPS from customers who Renewed More is seen.*

*One limitation with the NPS methodology is that it generally relies on survey responses that are subjected to the self-selection bias.*

*The paper demonstrates the validity of the NPS Methodology in Predicting the Revenue of an organization and provides academic validation to the Net Promoter theory.*

*As NPS can serve as a leading indicator to NRR as it will be valuable to business owners in maximizing revenue.*

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### **Key Words**

NPS, Net Promoter Score, Detractors, Customer Loyalty, NRR, Net Revenue Retention

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## Supply Chain Management in Pharmaceutical Sector

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### **ABSTRACT**

*The pharmaceutical sector discovers, develops, produces and markets drugs for use as medications to be administered to patients. Supply chain management is the management of the flow of goods and services which includes all processes that transforms raw materials into final products. The pharmaceutical supply chain involves wide variety of stakeholders including suppliers, wholesale distributors and pharmacy managers. The purpose of the study is to maintain inventory at different levels in supply chain management. The research methodology used is mailed questionnaire method at different district levels considering Bangalore. Research findings are the moving stock of drugs and non- moving stock of drugs at different levels by demand of drugs. As a result, supply chain management can transform the organization to make better use of assets and resources to enhance shareholder value and to positively respond to customer demand.*

### **KEYWORDS**

Discovers, medications, stakeholders, pharmacy managers, inventory, customer demand

# Improving Operational Risk Management Process with a Theoretical and Practical Algorithm

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## **Abstract**

*Risk management is an ongoing process that includes several stages of mapping and identification, analysis and evaluation, planning and implementation designed to reduce risks and ensure ongoing control. Risk management in industry and along the supply chain has become more significant in recent years due to the increased complexity of the relationships between different components in the chain and climate change and a variety of geo-political scenarios. One issue influencing the risk management process is the subjectivity of the auditor and bias in determining the risk levels in a process or any of its elements. Indeed, auditors may assess a given situation differently due to their specific history and experience. It is difficult to find cases in which different auditors made the same risk assessment and evaluation. With that in mind, we aim to develop an algorithm that will offer a solution to the problem of risk managers' subjectivity, while simultaneously providing the ability to cope with multiple data sources. Specifically, in this work we built a dataset based on actual risk surveys, gathered from expert human auditors to predict the final total risk score using the basic given risk factors. Our data set was used to construct a neural network-based algorithm to predict risk levels of processes in industry, allowing users to receive concrete information based on easily-collected parameters and checklists. This tool will support all stages of the process, and allow managers to obtain an up-to-date snapshot of the risk status in the process*

## **Keywords**

Risk management, Supply-Chain, Risk factors, Operational Risks

## **1. Introduction**

Risk management is an ongoing process that includes several stages of mapping and identification, analysis and evaluation, planning and implementation designed to reduce risks and ensure ongoing control. The first studies in the field of risk management were published in the late 1950s and early 1960s; interest in the field initially developed in the insurance sector but has now become an integral part of the ongoing management processes in other areas ranging from financial risks, medical risks, operational risks, safety risks and more [1].

Historically, there have been several definitions of "risk" as a concept. A recent review [2] proposed a definition in accordance with the Society for Risk Analysis (SRA) Glossary: "The likelihood of an unwanted event occurring, or the consequences of activity and the uncertainty associated with it.". The ISO 31000 standard, which deals with the process and standards accepted in the industry, defines risk as the effect of uncertainty on achieving goals. The effect could be a deviation from the expected target in a negative or a positive direction. The risk is the probability that any event that affects the target quantitatively or qualitatively might occur. The effect of the risk is a function of the probability and the damage. In practice, it is also

customary to refer to elements that reduce damage by applying protection and control mechanisms.

In addition to the increased complexity of the production processes, we are also currently witnessing an increase in disruptions of various types, due to climate change, the Covid-19 pandemic, and varied geo-political scenarios. Key factors affecting vulnerable points include volatility and disruptions on the demand side by customers; supply-side concerns (e.g., fluctuations in raw material prices, supply failures, logistical difficulties); regulatory and bureaucratic issues (e.g., political changes, tax systems, administrative barriers); infrastructure deficiencies (in production and information systems); and catastrophes such as terrorist attacks, natural disasters and pandemic [3].

The risk management methodology developed in the 1970s has reached a stage of saturation, and there are no longer revolutionary innovations in the methodology used in the industrial world. One major challenge in risk management is the auditor's subjectivity and bias in determining the risk levels of elements or operations. The current state-of-the-art is having human auditors assessing risks, with a large subjective bias based on the auditor's experience and background. It is difficult to find cases in which by different auditors made the same risk assessment and evaluation. In other words, if an organization retain two auditors it will receive two different risk assessment reports. The subjective nature of the human auditors might lead to various shortcomings. For example: optimism bias ("this cannot happen to us"), negligence of the root causes of dangers, misrepresentation (a single point of view may distort data) or "false alarm" situations (assessing the "worst case" scenario regardless of its feasibility), not discriminating between major and minor risks (i.e., assigning equal weight to all risks), and inaccuracy

Considering these lacunae, in this work we used a neural network-based algorithm to predict the risk levels of processes in the industry, while allowing users to receive concrete information based on easily collected parameters and checklists. We focused on creating a standard set of features, gathered from unique and genuine risk surveys and internal audit reports from various industries. Consequently, we trained a neural network for assessing the risk value of the organization by using 17 parameters related to the work procedures of each factory, and its corresponding risk-level target. The proposed model was validated and yielded high levels of fit and a low error rate.

## **2. Review of Literature**

For many years, mathematical tools have been used to study risk management in supply chains. In recent years, research has begun to consider additional tools based on artificial intelligence and multi-agent systems.

Industry and supply chain risk management has evolved in the era of information systems and digitization. A study reviewing the impact of digitization, industry 4.0 and big data concluded that the adopting new technologies may contribute to reducing the domino effect in supply chain risk [4]. However, it explicitly states that more research is required before offering decision-supporting systems for risk management, including the use of agent and machine learning algorithms to optimize stochastic systems. An extensive literature review of 224 international articles on supply chain risk management, published between 2003 and 2013, classified them as "definitions", "types", "factors" and "methods" for managing risks in the supply chain [5]. This comprehensive categorization helped identify different types of supply chain risk with varying degrees of external and internal impact.

Reference [6] does offer a model for managing supply chain risks in the era of big data, emphasizing planning and process control. It collects and analyzes extensive data from many



sensors and internal/organizational and external sources to provide decision makers with a report on the situation, which they could be used to redesign the chain. However, in the abovementioned work there is no predictive model based on the collected data, but only a practical data fusion for ease of presentation.

Several authors highlighted the theoretical potential of using big data to predict supply chain disruptions, although no real models or real uses cases have been reported [7].

Several recent papers offer solutions for specific parts of the supply chain. For example, using analytical tools in big data systems to detect fraud by rogue suppliers to reduce risks in the supply chain and increase its reliability [8] applied to supply chain risk management

The untapped potential of Big Data analysis and AI in supply chain risk management has also been identified by [4], whose digitalization framework presents a cyber supply chain built on traditional supply chain analysis. Their cyber supply chain relies on harnessing the power of Big Data, the Internet of Things, the cloud, and blockchain technologies. The authors emphasize the need for research that examines the relationship between these technologies and risk management in the supply chain, a need their current survey confirms

Another recent study [9] provides conceptual frameworks for managing supply chain risks using machine learning techniques and big data but did not continue to implement and evaluate the frameworks. Despite there being only few studies that implement learning, they conclude that it should be possible to rely on AI to uncover new knowledge that decision makers can combine with their expertise to make optimal decisions in the supply chain risk management process

Throughout the literature, it is evident that different AI techniques are partially applicable to the various stages of risk management in the supply chain, because of their particular capabilities (e.g., mathematical programming). Approaches succeed in reducing risks, but are unable to support automated decision-making and automated learning. Agents and machine learning techniques are less effective in modelling complex systems such as supply networks. Therefore, we propose exploring integration, modelling and optimization combined with AI techniques capable of making automated decisions based on prediction and learning for effective management of risks in supply chains.

### **3. Methodology**

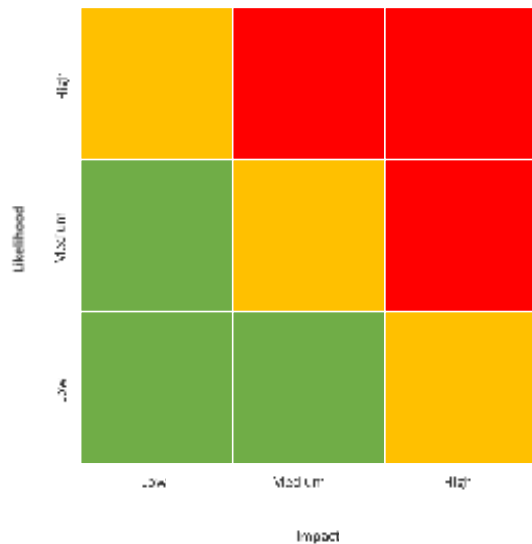
Understanding of the risk management process is important for mapping current gaps and challenges prior to applying a new computerized model to improve the accuracy of analyses made by decision makers and stake holders. In this section, we briefly describe the workflow commonly applied by auditors when conducting risk assessment and managing risk, and then we will describe our newly theoretical and practical algorithm. In this research we used Deep Learning algorithm with input layer of risk factors and output of risk result (probability of the risk) in order to train a model of predicting future risk.

#### **3.1. The Risk Management Process Today**

The risk management process is an ongoing effort that includes identifying, analyzing, and assessing the risks and providing responses to each scenario on strategic and operational management levels. During the risk identification stage, the possible causes of disruptions and the impact of the events are examined for both external and internal factors. The work begins with data collection, interviews, and observations of the processes. Next, the process of risk analysis includes determining the risk level of each event given the probability, results, additional effects, and control mechanisms for reducing the risk and their effectiveness. Finally, a comprehensive assessment of the risk considers the previous stages and consequently

decisions can be made with respect to addressing each risk. Decisions may range from taking no action and accepting the full risk (for low-risk events) to taking a range of preventive actions; most severely, a target might be abandoned due to the high risk.

**Figure 1** shows a Risk Matrix (RM) model that is commonly used in industry [10]. This methodology shows that a higher risk level (the red squares in the RM model) are the product of being very likely to occur and the severity of the potential damage. Higher risk levels call for an immediate response, while lower risk levels (the green squares) are risks that can be accepted without taking significant actions.



**Figure 2.** A RM model describing the severity of the risks

### 3.2. Implementing Neural Networks in the Risk Assessment Process

To begin developing our suggested methodology, we first created an exhaustive list of parameters that are commonly checked by risk auditors. and built a standard checklist that covers most of the operational risks. Next, we converted the findings of 60 genuine risk survey reports in accordance with that checklist. We then fitted the relevant total operational risk of each survey, according to actual findings, as a dataset to train a machine learning model to predict such risks.

#### 3.2.1. Data Gathering and Preprocessing

To meet the goal of applying machine learning tools, sufficient data needs to be collected and preprocessed. Risk assessment work is unique because the data available for the auditors is usually highly classified business information that is not publicly available. Moreover, human auditors do not use a commonly defined methods and scales for the risk assessment process. Therefore, attaining data for the purpose of our goal was challenging. That said, the authors managed to acquire real operational risk data from surveys conducted by different professional auditors in 60 factories. The data was made available because of the personal expertise and access of the principal author, a senior risk analyst, and his colleagues. Real risk assessment reports from the last ten years were gathered and compiled by quantifying the free form text and numerical assessments according to seventeen parameters for each factory in the supply chain. Each parameter was given a value: 1 = an appropriate level of integrity, 0 = a neutral level, and -1 = material weakness. **Table 1** shows the complete list of these 17 parameters. In addition to these parameters, each compiled report included risks values as quantified by the

human auditor. To quantify the values  $\{-1,0,1\}$  for each parameter, each parameter was graded based on a set of common sub-parameters values.

**Table 1.** list of parameters in the input layer

No.	Parameter
1	Organizational culture and corporate governance
2	Document processes and procedures
3	New Vendor Handling Process
4	Purchase Orders
5	Inventory control
6	Payment control
7	Sole supplier dependency
8	Sole raw material dependency
9	Long lead time
10	Information systems supporting the processes
11	Frequency of the action
12	Frequency of failure in the process
13	Ability to stop the action in case of hazard
14	Level of mission's complexity
15	Dependency of accumulated success factors (non-parallel)
16	Dependency of accumulated failure factors (parallel)
17	Susceptibility to random and unstable factors on the process completion

For example, the first parameter, “Organizational culture and corporate governance” was compiled from the following sub-parameters:

**High level of organizational responsibility** – Is there an ethical code of conduct for the employees? Do employees get periodic training? Is there is a culture of debriefing and learning?

**Commitment to the organization** – Is there a high level of employee turnover? Are employees and managers loyal to the system? Have there been breeches of contract or procedures issues with the staff? Were there integrity problems with the staff?

**Culture of exploring and learn lessons** – are there procedures regarding audits and learning lessons? Are they well documented?

**Culture of correcting defects** – Are there procedures regarding corrective actions? Is there a plan for testing the implementation of correct procedures?

### 3.2.2. Fine-tuning the input layers

In order to apply our model on real world companies, we used risk surveys prepared by professional auditors at 60 selected companies. The first task was to fit the narrative and findings of each process into our parameters and relevant checklists to create a stable database

for the model. For example, we chose two companies: company #2, a metal recycling company in northern Israel who had many operational problems including working accidents and frauds, and company #3, a manufacturer of plastic pipes in eastern Israel, which is well run and fully controlled. These reports were prepared and edited over a period of 3 months to provide the boards of directors with insights on the operational risks of each company to reduce risk and improve efficiency. **Table 2** shows how the text from the risk surveys was converted into a table of parameters. Then each parameter in each company, was graded  $\{-1,0,1\}$  for the adequacy of its execution of the said operation, as a sum of its prelaminar sub-parameters.

The total operational risk score calculated using the authors' methodology corresponds directly to the findings of the risk survey reports. In each company, the narrative and the risk matrix correlate with the risk score and faults and weaknesses that were found. Company #2 was graded 0.7, which represent relatively high risk. Company #3 has stronger controls and minor weaknesses, and was graded 0.4, which is relatively low. In this preliminary project, we set the total risk as a target, in order to train the model.

**Table 2.** Example of two companies from the sample (partial parameters)

Parameter	Company 2	Company 3	Gaps
Organizational culture and corporate governance	-1	1	Company #2 has high turnover and personnel problems; a few scams and frauds were discovered in past years. Company #3 has very low staff turnover, a good code of conduct and ethical procedures are circulated by management
New Vendor Handling Process	-1	1	Company #2 has poor procedure and documents regarding selecting and appraising suppliers. Company #3 has adequate procedures for selecting suppliers and well-established annual appraisals.
Purchase Orders	0	1	Company #2 has poor procedures and documents for purchase order confirmation and control. Company #3 has an adequate ERP system that applies rules to control purchase processes.
Inventory control	0	1	Company #2 inventory has no ERP control and the inventory counting show many inventory differences. Company #3 has very good inventory control and reports show that inventory integrity is high.
Information systems supporting the processes	-1	1	Company #2 has much software, but without interface and connectivity between them, the IT staff has many missions but does not respond promptly due to shortage of professional staff. Company #3 have a strong IT team and very good support on time to service calls.

### 3.2.3. Set-up the model

With the newly available data, we are now faced with a supervised predication problem. There is data from 60 observations, each with 17 parameters (valued  $\{-1,0,1\}$ ), and a score in the range  $[0,1]$  that represents the total risk assessed for that specific organization. We then constructed a neural network with 17 input neurons, 20 hidden neurons in the next layer and a

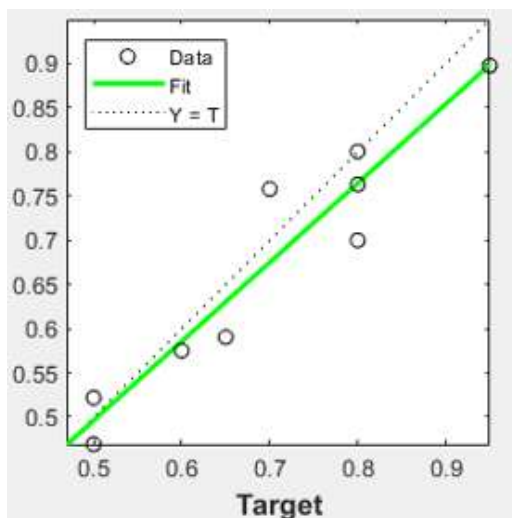
single output neuron which outputs a value in the [0,1] range. This architecture is not claimed to be optimal for the problem at hand and was constructed ad-hoc via trial and error. To train the network we divided the dataset into 42 training samples, 9 validation samples and 9 testing samples. The model was constructed in MATLAB and the network was trained using two different algorithms, Levenberg-Marcardt and Bayesian Regularization. The latter yielded a higher level of accuracy.

### 3.3. The trained Neural Network

After training the neural network and completing the validation and testing, the findings fit well. The R (correlation coefficient) fit between output data and the target of the model was high (R=0.951), which represents a significant positive linear relationship and allows proper prediction and low error rate. **Table 3** shows the sets structure and results after the runtime. The graph in **Figure 2** created at the end of the process and show the parameters of the network.

**Table 3.** Sample size and structure

<b>set</b>	<b>Samples</b>	<b>MSE</b>	<b>R</b>
Training	42	2.44E-03	9.41E-01
Validation	9	0	0
Testing <sup>9</sup>		2.56E-03	9.52E-01
Total	60		



$$R^2 = 0.90563$$

$$Output = 0.9 \times Target + 0.049$$

**Figure 2.** Model output testing results

## 4. Results & discussion

In order to validate our model, we used two additional, real-life test cases and predicted their risk levels. We took additional raw data from previous risk surveys, without introducing them to our model in the training or testing phases.

#### 4.1. Predicting Risk Levels Using the New Model

Our goal was to predict the risk levels computed by the algorithm and comparing it to the score to the auditors’ assessment in the field. We analyzed the findings for two plants, retrieved raw data from audit reports, organizing it by parameters and graded each item, as above (1= an appropriate level of integrity, 0= a neutral level, and -1= material weakness). Plant A had poor internal controls; its risk survey and audit showed many weaknesses. For example, it received (-1) for “Document processes and procedures” due to the lack of written work procedures on the production floor and no standards or protocol distribution to employees. Plant B had a better management and working procedures, therefore receiving many high scores (1) due to its appropriate practices. Finally, we entered the 17 parameters for each plant into the neural network and execute the predict operation in order to receive the calculated output of the model.

#### 4.2. Computed Risk levels

After running the new dataset, the risk levels computed by the model showed very good fit to the auditor’ conclusions at their reports. The model, as shown in **Table 3**, assigned plant A, with its weak procedures, a high-risk level (output = 0.8738), while plant B, with robust internal controls, strong working procedures, and well-managed staff received a low risk level (output = 0.4366). For research purposes, we are satisfied by the initial results, and believe that the proposed developed will improve the fit thereby reducing errors in the network and application of our novel decision-support tool.

*Table 3. Validation of computed risk scores*

<b>parameter</b>	<b>A</b>	<b>B</b>
Organizational culture and corporate governance	-1	1
Document processes and procedures	-1	1
New Vendor Handling Process	0	1
Purchase Orders	-1	0
Inventory control	0	0
Payment control	-1	1
ole supplier dependency	-1	0
Sole raw material dependency	0	0
Long lead time	0	1
Information systems supporting the processes	-1	0
Frequency of the action	0	1

<b>parameter</b>	<b>A</b>	<b>B</b>
Frequency of failure in the process	0	1
Ability to stop the action in case of hazard	-1	0
Level of mission's complexity	-1	1
Dependency of accumulated success factors (non-parallel)	-1	1
Dependency of accumulated failure factors (parallel)	0	0
Susceptibility to random and unstable factors on the process completion	-1	1
<b>Computed risk score by the algorithm</b>	<b>0.8738</b>	<b>0.4366</b>

### 4.3. Future Research Goals

As stated in the Introduction, the overarching goal of the research is to create an automated tool for risk assessment in the industry. In this work we show that machine learning is a highly viable and effective paradigm for both shortening the time needed to prepare a risk report, and increasing the accuracy and objectivity of the system that calculates the weighted risk. The high level of correlation found in the experiments allows us to take the basic model a step further, and attempt expanding it by introducing the ability to integrate automatic input from various sensors that provide data from the factory's production, logistical, and computer systems. With that in mind, our work will continue in three different but complementary directions: a methodological framework, theoretical risk arithmetic and finally, a stand-alone application for risk assessment in the field.

First, with our newly constructed model that can predict and quantify risks based on a set of predefined data parameters, we can proceed to construct a methodological framework to unify auditors' processes for working with the model. The main goal of this methodology is to decrease the variability in assessments by different auditors due to subjective bias in the assessment process.

Next, we aim to lay the foundations for a theoretical analysis for measuring risk. We will develop a mathematical language that allows systematic deconstruction of risk factors into their predecessor factors using vector mathematics. Our intuition is that it should be possible to view a single operational risk as a compound value, according to its basic sub-factors. The structure of the risk mapping may involve several factors, either parallel or sequential.

## 5. Conclusions

In this paper, we took the first step in automating the risk assessment process, by reconstructing risk factors as vectors in a network. We have constructed a neural network model for the risk assessment process to provide a more objective evaluation of the risks.

We found that there is a proper correlation when applying risk factors fitted to their targeted total operational risk and believe that future research will enable us make the system more robust and create an effective, efficient, and dynamic tool. The final research goal is to produce an objective view of risk status via the systematic approach of stand-alone software using automated interfaces with ERP and other digital sensors with minimal manual operation and negligible subjective bias. We believe that using this quantitative algorithm can reduce uncertainty and improve the success of projects while decreasing errors and failures

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## Adaptive approach in learning for sustained upskilling in project management

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### **Abstract**

*This paper explores the various approaches adopted by project managers and individuals in related roles to continuously enhance their knowledge through additional learning. The period between the 2019 and 2022 has been marred by the onslaught of a global pandemic which has resulted in paradigm shift for many organizations and the way they conduct business. The paper attempts to analyze the impact of this global event on their projects and assignments. Is there an impact on the program and project objectives aligning with the strategic focus on business sustainability during the global crises is also studied in this paper. The paper is a study to understand how the compounding effect of this disruption caused the need for gaining additional knowledge in the project management community. The paper brings out the essence of continuous learning as core for survival technique for project management community in a fast changing business and technology environments.*

# An ISM-MICMAC based study on the interactions among “Cost of quality” factors

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## **Abstract**

*In context of manufacturing, quality management includes - product quality, quality of associated processes, staff and the internal as well as external environment of the organization. The term “Cost of quality” includes cost of all such factors that occurs in sustaining overall quality standards while managing the operations. A manufacturing unit with a diversified product portfolio, along with associated factors affecting costs and quality, creates a complex system which requires soft systems methodology (SSM) to understand the interactions among them and help decision makers to look for optimum balanced solution. The interpretive structural modeling (ISM) along with MICMAC as a part of SSM, is an ideal tool for optimizing complex problems, where the decision makers deal with pluralist view, like cost-benefit trade-off in quality management. The generated digraph helps to understand the hierarchical based interactions among factors and provide ease to pick crucial factors and classifies them on the bases of their driving and dependence power upon the others. Based on the NGT workshops with domain experts, this paper has identified 14 factors affecting cost of quality in an ancillary manufacturing unit and explored the relationship between these identified factors to build a hierarchical structure and understand cost of quality in pragmatic and real-time manufacturing environment. The major findings reveal revenue maximization as the top most dependent factor whereas vendor expertise, inventory cost and quality tools found at the base of the model as the most driving factors for others.*

## **Keywords**

Cost of quality, Soft systems methodology, Nominal group technique (NGT), ISM, MICMAC

## **1 Introduction**

Quality management starts with a well-documented and directed preventive maintenance program that saves lot of cost as compared to reactive maintenance. Companies adopt management systems to guarantee that quality satisfies customer needs, and attempts are made to quantify success using monetary and non-monetary metrics (25). There is always some tangible/intangible or direct/indirect costs attached to the production cost in order to maintain the quality (Crosby, P. B. (1979). Quality is free-if you understand it. Winter Park Public Library History and Archive Collection, 4.). Sometimes these costs

are realized prior to production process, which indicates the prevention approach and include steps like system development, providing training to labors, supervisors as well as quality inspectors, etc. This preventive aspect under cost of quality is termed as cost of conformance and it is further divided as preventive and appraisal cost of quality. The cost of non-conformance occurs once a defect is detected, that is after production, such as handling/reworking cost, managing product recalls and complaints, etc. There are several methods that can be used to collect, categorize and measure quality costs. 20 and 13 proposed the P-A-F (Prevention, appraisal and failure) method, which divides quality costs into three categories: prevention, assessment, and failure. This is the traditional and widely acceptable approach of classifying CoQ. Prevention costs are associated with actions taken to ensure that a process provides quality products and services, appraisal costs are associated with measuring the level of quality attained by the process, and failure costs are associated with correcting quality in products and services prior to (internal) or after (external) delivery to the customer.

In order to maintain the quality and to deliver satisfactory customer value, there is a kind of cost attached to it either in the form of preventive cost or at the failure detection (or cure) stage. There is some sort of prior investments and associated costs that are incurred in order to prevent quality loss expenses and also costs are there in the processing stage like in the form of maintenance and inspection costs (27). Costs are also incurred when the final output has defects, and their delivery to the customer's needs to be stopped, so that the problem can be resolved within organization, rather than facing customer rejection.

Every organization has an identified list of, different types of costs, that are incurred in quality management (24) and there exists a non-linearity amongst these cost variables. There are numerous possible connections and linkages of relationships between them, where one type of cost can derive the other or can be dependent on other. The problem is not simply about cutting down the cost, as quality costs are never eliminated but they are optimized as per cost-benefit tradeoff. In this scenario, where main quality attribute is the conformance, it becomes more prudent to understand the criticalities and dependence of all the variables of cost of quality. In addition to this for any ancillary organization, a firm that is an intermediary organization, and serves as a supplier, the level of complexity is even higher; as they have multiple types of clients from varied industries, resulting in wide product varieties (21). Soft systems methodology becomes the perfect tool in dealing with such complex situation, where the cost variables are required to be analyzed in a given contextual scenario and their hierarchal relationship is needed to be established for better quality-centered decision making. Building interpretive structural model (ISM) helps to clarify the dependence of various variables on each other and their overall impact on the system. MICMAC analysis further clarifies the degree of dependence and driving power of each, and help to identify the dependent, autonomous, drivers and interdependent factors.

## **2 Review of literature**

Quality costs can be used as a criterion for evaluating an organization's quality, but only if meaningful comparisons can be performed between different sets of cost data. Clearly, the definitions of the cost categories and items used in producing data affect the comparability of sets of data. However, finding general terminology to represent specific jobs or activities in diverse sectors, organizations, manufacturing and services with the same basic aims is challenging. This makes collecting and comparing data

from many sources extremely challenging (Dale, B. G., & Plunkett, J. J. (1991). Quality costing: An introduction. In *Quality Costing* (pp. 1-22). Springer, Boston, MA.; Dale, B. G., & Plunkett, J. J. (2017). *Quality costing*. Routledge.

In past researches, several authors expressed dissatisfaction with how businesses track and analyze quality costs (28; Chen, F. (1992). Survey of quality in Western Michigan firms. *International Journal of Quality & Reliability Management*. 32 discovered that just a rudimentary implementation of CoQ and suggested that its usage should be enhanced. According to 26, about one-third of businesses are interested in implementing CoQ system.

In light of the reviewing experience of various quality cost models focused on manufacturing industry, 23 categorised and discussed quality cost models. Many of the models were found to be flawed and deceptive, casting considerable doubt on the concept of an optimum quality level. The authors discovered various notional models in the literature that purported to show the links between the major categories of quality costs and a few sets of real data. Despite the fact that all of the models are built on the same concepts, there are significant disparities between some of them, as well as between the models and actual data.

22 developed a quality cost simulation model using published literature and input from a semiconductor company's quality control manager and supervisor to design various quality control plans and analyze their impact on quality cost under a specific section of the company's process. As future scope, the authors indicated the expansion of the model to more complex process configurations.

16 conducted a survey for both service and manufacturing based companies to provide information on the current state of quality cost management in practice, as observed in connection to various company characteristics along with the insights of variables identified as critical for obtaining better results in quality cost management. The paper highlighted that despite of the relevance, there is less awareness about CoQ concept and companies primarily adopt it to fulfill the requirements for ISO 9001:2015 certification. The researchers also suggested a limitation that instead of questionnaire, interviews for quality cost related data can be a better scope for future researches.

There are minimal empirical researches or case studies on the COQ front in India (29). According to 14, emphasizing empirical evidence from operations and management practitioners along with academics is vital for CoQ researchers and practitioners rather than theory centric because it allows theoretical models to be tested in a real-world setting. Using the case study of a manufacturing company where P-A-F based CoQ analysis is applied, 12 investigated the inspection strategies through evaluation of quality-cost trade-off and indicated the application the same general systems engineering technique for quality improvement of manufacturing systems to various types of sectors in order to better assess the framework's validity.

With a sample of 400 observations, 30 concluded that long-term results show much greater quality performance and lower quality cost. Quality expenses grow at a rate of less than half than that of sales volume, which indicates a considerable scale effect in quality cost reduction. Also, changes in conformance cost per sales volume and changes in non-conformance cost per sales volume have a substantial positive association in the long term. Increasing prevention and appraisal costs does not match with lowering internal and external failure costs in the chosen sample. As a result, boosting internal and external quality performance (cutting internal and external failure costs) while lowering product conformance costs can be accomplished in the long run.

Dimitrantzou, C., Psomas, E., & Vouzas, F. (2020). Future research avenues of cost of quality: a systematic literature review. *The TQM Journal*. highlighted future research opportunities in the realm of CoQ. The results of this systematic literature review of 97 research papers focusing upon sectors like construction, manufacturing, service, food/agro and miscellaneous sectors, revealed that future research in CoQ can be organized into eleven relevant themes like Impact on CoQ elements, CoQ data and information, Methods and analysis, CoQ effects, CoQ integration with other management approaches, CoQ failure and success factors, etc. The authors also suggested that CoQ studies must be extended to different sectors/subsectors/units.

Many CoQ research publications present high-quality cost models, methodologies, and strategies, as well as a wealth of knowledge on the subject. Despite the fact that quality is regarded as a critical concern, a study of the literature on the practical use of CoQ reveals that the CoQ method is not completely utilized. Organizations value quality costing, but only a small percentage of them utilize a formal quality costing strategy.

### 3 Methodology

#### 3.1 Objectives of study

**Objective 1:** To identify the cost of quality factors

**Objective 2:** To establish the relevance relationship among identified factors through ISM-based digraph

**Objective 3:** To classify the identified CoQ factors on the basis of MICMAC analysis

#### 3.2 Nominal group technique (NGT)

It is an immensely efficient when used with the soft systems as a procedure for generating consensus and as a tool for information or idea generation (17). This study employed the NGT approach with total 6 experts from quality control & operations department of the selected manufacturing unit and including 1 outside expert, to finalize the list of 14 elements and assess the linkages between the elements that had been identified. The profile of the respondents included quality control inspectors, supervisors, operations department head and section level manager. At initial stage, it the factors were identified through segregation into input-process-output and then clustered into appropriate broad categories. In the second stage, these elements, which were similar or related, were submerged into one generic term, which was identified, by literature review and expert opinion. The elements thus generated have been defined below to precisely identify the concepts of cost of quality being covered by them.

#### 3.3 Interpretive Structural Modelling (ISM)

It is an interactive learning method that organizes a range of elements into a systemic model that are both directly and indirectly related to one another (31). The soft systems methodology (Checkland, P. B. (1989). *Soft systems methodology. Human systems management*, 8(4), 273-289. is often used to deal with problems that are not well-defined in terms of what has to be done because there are no obvious or well-specified goals at the outset.

#### 3.4 MICMAC

The Matrice d'Impacts Croisés Multiplication Appliquée á un Classement (MICMAC) was developed by 11. Based on driving and dependency power, elements in this study were classified using MICMAC analysis.

## **4 Analysis and interpretation**

### 4.1 Identification of elements

#### 4.1.1 Cost optimization

It is defined as a process, act or a method of building a design, system or a decision as completely perfect, effective and functional without compromising the quality. As per the customer perspective it is seen that if costs are optimized then prices are controlled. The tight competition drives every organization to cut down the cost (ASQC: American Society for Quality Control, Quality Costs — What and How (1970), N. York p.54. It is difficult when the product range is broad and each needs attention. It is also possible that the over cost rose due to one particular item may affect the related one also. Therefore, taking the best out of the least cost is an essential and indispensable for such an organization that cannot simply drop a particular product in lieu of its uncontrolled cost, as there is a demand for it.

#### 4.1.2 Conformity

Conformity to customer expectations is defined under the dimensions of quality (15). Organization needs to ensure the product and quality specifications defined by the customer have been delivered within tolerance of customer expectations.

#### 4.1.3 Revenue maximization

The term is a popular theory by Baumol, W. J. (1959). Business behavior, value and growth.. Sales maximization not only through increasing sales volume but also by reducing the opportunity cost of lost sales and product recalls due to defected products. This impacts the goodwill also and enhances further chances of orders from customers.

#### 4.1.4 Rejection rate

Rejections are the factors, which impact the cost control aspect most severely; therefore organization should try and reduce the probability of rejection, by popular methodologies like the cyclic PDCA (Deming, W. E. (1950). PDCA (plan-do-check-act or plan-do-check-adjust). 1950-12-30)[2014-5-25]. <http://en.wikipedia.org/wiki/PDCA>.) method for improvement from time to time, so as to reduce the chances of the defects. Such methods are vital for quality and they require a kind of monitoring, inspection and data recording costs.

#### 4.1.5 Quality management system

A British management consultant Ken Croucher gave the term 'quality management system' or 'QMS' (Croucher, K. (1991). Co-existence of TQM and quality management systems. SQM. The quality control and operations department in the organization is responsible for making the overall production (from procuring raw material to product delivery) system smooth, efficient and effective so that it can help to attain and maintain the Quality management system of the organization (18)

#### 4.1.6 Standardization

More standardization enables more quality. Obtaining standardized procedure helps to reduce wastage, save time and cost at every stage. There are various other bodies that do conduct periodic audits and provide ratings and accreditation like IATF (an International level audit for assessing product, process and overall performance). The results of such audits express the level of standardization obtained and maintained by the organization. Though there is associated cost for implementation of such programmes, but ultimately aim for achieving best quality is delivered.

#### 4.1.7 Continuous improvement

It is also known as Kaizen (19), and includes periodic review of the product and process quality. The result is consistency in procedures across a diversified product portfolio where each variant should confirm to the quality. It includes identifying benchmarks of outstanding practices and making an attempt to carry them out.

#### 4.1.8 Vendor expertise

In case of this ancillary organization, the raw materials are primarily the zinc and the aluminium along with their alloys. The size, density of bricks and the chemical composition needs to be checked, as there are hundred varieties of zinc and aluminium that are used for making around twelve hundred products. Therefore the Vendor assessment becomes important, who can provide the right type of material. This ultimately affects the value being delivered in the form of product and thus it is the basic and initial form where the organization incurs cost for quality.

#### 4.1.9 Quality tools

It can also be defined as measurement system analysis, which means checking the instruments that are used to check the raw material and the final product quality. They involve measuring and testing tools, equipments and some automatic visual and technical inspection machines, like for example, vernier calipers and screw gauge measures the physical dimensions like diameters, length, breath etc. They all have a cost element and they also require some maintenance cost.

#### 4.1.10 Employees expertise

The workforce is the most significant factor that creates a direct impact on the product and process quality. The value delivered is going to be influenced by the expertise of the people engaged in work floor, production managers and the one in the quality control department. As the organization employs skilled, semi-skilled and unskilled categories of people, the scope of imparting requisite skill via training is wide, this in turn, will have associated cost.

#### 4.1.11 Preventive Maintenance

The best way is to prevent the defects to occur, and if at all the defect has occurred, it is better that the defect is detected internally that means before going to the hands of the customer. In case if it is from the customer side, the preventive action is not confined with that product but the preventive approach will go for entire product portfolio. The cost incurred in this form is mainly the reworking cost (melting the item again to original form, making slight surface changes or finishing), redesigning cost and opportunity cost lost.



4.1.12 Inventory cost

The inventory cost sounds like a normal cost, but is attached to the cost of quality. The inventory requires handling, storing, transporting, etc. The inventories (raw material as well as work in progress) require a proper place for keeping, a proper method of handling and transporting; and to make these arrangements organization constructs warehouses, make them moisture free and other precautions. The labor force is also employed for these tasks and all these together require management and they contribute to cost of quality.

4.1.13 Maintenance cost

The whole manufacturing depends upon the machineries used. The maintenance cost involves maintenance of machineries- planned as well as unplanned. The planned maintenance is means when it is known that after some duration of time, the machine requires a kind of health check-up and examining the machine performance on a periodic basis and calibrating it for required performance so that the quality is maintained. The unplanned maintenance cost occurs due to a sudden break down in the machine.

4.1.14 Operational cost

It involves all the types of costs that are incurred during the production for maintaining the quality control. In the chosen firm, these costs are incurred by keeping a quality inspector, supervisors and technical experts.

4.2 Developing ISM

4.2.1 Structural Self-Interaction Matrix (SSIM)

The next stage in building ISM was the creation of the SSIM or VAXO framework (Table 3), which was used to identify the relevant relationships between all 14 factors.

Table 3 Structural Self-Intersection matrix (SSIM)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1		A	V	A	A	A	A	O	O	X	A	A	A	A
2			V	X	A	A	A	O	O	A	A	O	O	O
3				O	O	O	O	O	O	O	O	A	A	A
4					X	X	A	O	O	O	X	O	O	V
5						X	X	A	A	O	X	A	A	X
6							A	O	O	O	A	O	V	V
7								O	O	O	A	A	A	A
8									X	O	O	X	O	O
9										O	O	X	O	O
10											A	A	O	A
11												O	X	X
12													O	V
13														X
14														

4.2.2 Formation of initial reachability matrix

The initial reachability matrix is formed from the SSIM. It's a binary matrix with the values 0 and 1 and the directions are as follows:

- In place of 'V' at any cell location "i, j" write 1 and write 0 at cell "j, i".
- In place of 'A' at any cell location "i, j" write 0 and write 1 at cell "j, i".
- In place of 'X' at any cell location "i, j" write 1 and write 1 at cell "j, i".
- In place of 'O' at any cell location "i, j" write 0 and write 0 at cell "j, i".

4.2.2 Formation of final reachability matrix

The initial reachability matrix is converted to the final reachability matrix (Table 4) by performing transitivity check. The colored cell indicates the error rectification. The row total indicates driving power and column total indicates dependence power to be used for MICMAC.

Table 4 Final reachability matrix along with level partition

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Dr	Level
1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	4	II
2	1	1	1	1	0	0	0	0	0	1	0	0	0	0	5	II
3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	I
4	1	1	1	1	1	1	1	0	0	1	1	0	1	1	11	III
5	1	1	1	1	1	1	1	0	0	1	1	0	1	1	11	III
6	1	1	1	1	1	1	1	0	0	1	1	0	1	1	11	III
7	1	1	1	1	1	1	1	0	0	1	1	0	1	1	11	III
8	1	1	1	1	1	1	1	1	1	0	0	1	0	1	11	IV
9	1	1	0	1	1	1	0	1	1	0	0	1	0	0	8	IV
10	1	1	1	0	0	0	0	0	0	1	0	0	0	0	4	II
11	1	1	1	1	1	1	1	0	0	1	1	0	1	1	11	III
12	1	1	1	1	1	1	1	1	1	1	0	1	0	1	12	IV
13	1	1	1	1	1	1	1	0	0	1	1	0	1	1	11	III
14	1	1	1	1	1	1	1	0	0	1	1	0	1	1	11	III
<b>Dp</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>11</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>3</b>	<b>3</b>	<b>11</b>	<b>7</b>	<b>3</b>	<b>7</b>	<b>9</b>		

4.2.3 Level Partitioning

Level partitioning described the location of each element or challenge in the diagraph levels. The levels generated after level partition are indicated in the last column of Table 4 itself. There are 4 levels attained after level partitioning.

4.2.4 Constructing ISM

In Fig. 3, the four levels attained in the ISM hierarchical model are indicated. Revenue maximization is at the top (level I). The element at level I indicate that it is the most dependent factor and that all the elements below will ultimately drive the element at

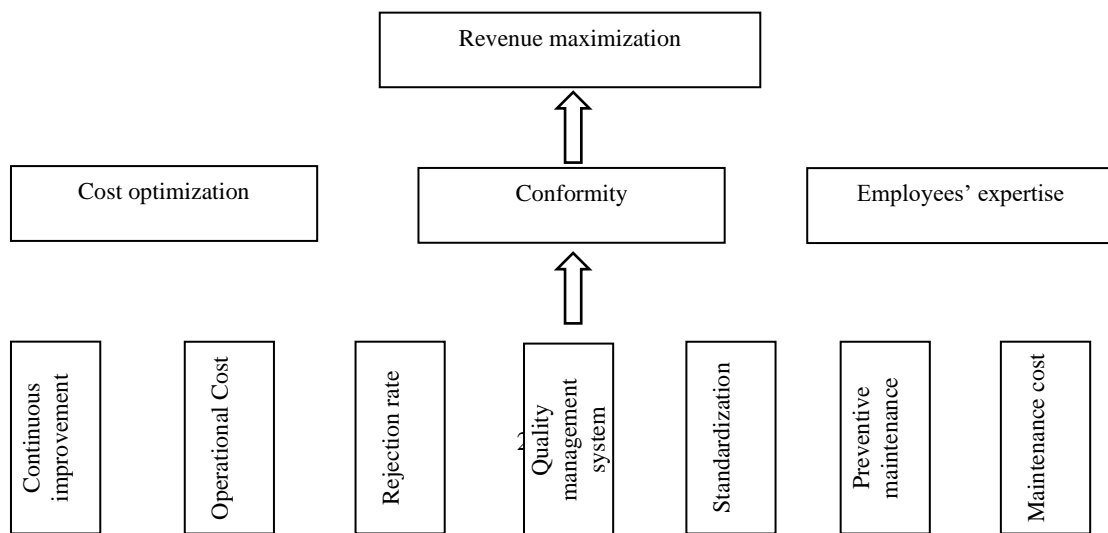
level I. The direction of hierarchical arrows starts from bottom to top indicating the elements at base level (level 4 in this case) are driving the elements at above level(s). All the elements associated with underneath levels will ultimately impact the revenue of the organisation, and hence revenue maximization is dependent upon other elements.

As per the diagram interpretation, the elements at same level are interrelated with each other. At level II, cost optimization, conformity and employee expertise are present. This level consists of the elements that are dependent on the CoQ factors at level III and IV. With a focus on initiatives like continuous improvement, standardization and QMS, final output will conform more to customer specification, allowing for better acceptance rate and cost optimisation. Employee expertise though will play the role of moderator, which will limit the extent to which all other elements affect other CoQ factors, as the final deliverance of quality centered output will be directly proportional to skill set of the employees.

At level III continuous improvement, operational cost, rejection rate, quality management system, standardization, preventive maintenance and maintenance cost. Continuous improvement and operational cost are present at the same level of configuration, which specifies that both the elements are symbiotic to each other and presence of one will lead to occurrence of other. The moment a firm strives for continuous improvement, it will have some impact on operational cost and vice versa. At the same time, if we want to optimize the operational cost, we need to introduce continuous improvement initiatives. The same explanation can be applied to, quality management system, standardization and rejection rate. Better QMS and standardization, the lower will be the rejection rate. The moment rejection rate increases firm needs to relook at QMS and hence standardization will be effected. Similarly, preventive maintenance and maintenance cost are bracketed in the same group as one will define the other. In totality continuous improvement, QMS and standardization are such elements, identified as key linkages in the hierarchy , as overall processing and quality control scenario will affect these elements and the presence of these operations management-based techniques, boost other CoQ factors to perform optimally.

The base elements at level IV are vendor expertise, inventory cost and quality tools or equipment, which tells us that in quality oriented production process, these elements needs utmost attention as the will shape the final outcome. It is possible that some factors on a level do not directly affect all the elements on the above level. Therefore, we see that vendor expertise and inventory cost drive continuous improvement, operational cost, rejection rate, quality management system and standardization directly but not preventive maintenance and maintenance cost.

Fig. 3 ISM for CoQ factors



### 4.3 Developing MICMAC

On the basis of their driving and dependency power (Table 4), the elements under examination are categorised using MICMAC analysis (Fig. 4).

Fig. 4 MICMAC for CoQ factors

High	14	<b>Drivers</b>							<b>Linkages</b>						
	13														
Driving power	12		12												
	11		8				11,13	7	5,6	4					
	10														
	9										14				
	8		9												
	7	<b>Autonomous</b>							<b>Dependent</b>						
	6														
Low	5													2	
	4									10			1		
	3														
	2														
	1													3	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		<b>Low</b>							<b>High</b>						
		<b>Dependence power</b>													

The factors with low dependence and driving power are termed as “autonomous factors”. No element in the present study falls in this category of autonomous factor, which means every factor is affecting cost of quality, and no identified element is functioning in isolation. The factors with low driving and high dependence power are called “dependent factors”. The elements which fall in this category are, revenue maximization (*Element 3*) which has highest dependent power, signifying that revenue is the outcome of the performance of all other elements; Conformity (*Element 2*), which involves specification check, which is performed once the production task is complete, and acts as a report card of overall production process and reveals whether the base level factors are going in the right direction; Cost optimization (*Element 1*) is achieved when all the costs are optimized to the fullest and hence increase the overall profitability; Employee expertise (*Element 10*) which has the lowest dependence, and act as performance moderator, which regulates other elements. For example, the knowledge and experience of staff will leads to some changes (positive or negative) in the overall performance.

The factors with high driving and low dependence power are called “drivers”, and includes elements like, Inventory cost (*Element 12*), which has the highest driving power and indicates that it is primary level task in the production chain and hence drives or supports the functioning of other elements in operational chain, which is

justified also as quality management at inventory phase includes, accurate raw material handling, storing, transportation and maintaining favorable conditions for proper storage of the raw material. Vendor expertise and material check (*Element 8*), has next highest driving power which indicates that identification and selection of an effective supplier, providing technical assistance to the supplier act as crucial tool in quality management, as it provides raw materials with minimum, ensuring quality at the onset. Rejection analysis & preventive maintenance (*Element 11*) and maintenance cost (*Element 13*) falls in the same category, that has a high driving power but they also have a bit of dependence power. The cost incurred in terms of analysis & preventive maintenance, will come into the picture when there is deficiency in the production process, justifying their dependence on other factors. But overall they drive the total cost aspect in the form of opportunity cost lost due to extra time incurred. Maintenance cost is an umbrella term encompassing maintenance cost not only in terms of products and machineries but also cost of technology advancement for quality enhancement or any miscellaneous maintenance. Quality tools (*Element 9*) is a moderate driver as they are instruments used for checking the raw material quality drives the raw material performance and hence affects the quality of production.

The factors with high dependence and high driving power are termed as “linkages factors” and include factors like; rejection rate (*Element 4*), which has highest dependence and driving power, due to fact that rejection rate, on one side is dependent upon the raw material quality and process quality whereas on the other hand it drives the overall conformity cost including operational cost. Quality management system (*Element 5*), Standardization (*Element 6*) and continuous improvement (*Element 7*), are classified as linkages because there is a feedback cycle, where adoption of QMS leads to standardization, till the time any disruptive technology redefines the entire procedure, giving rise to a cycle of continuous improvement by following QMS and standardization. This cycle of continuous improvement methodology, on one hand drives other processes and cost and on the other hand, their level and achievement is dependent on the performance of other elements. Operational cost (*Element 14*) is dependent upon rejections, time factor, maintenance costs, etc., and drives the overall revenue or the profitability. For example, if operational cost is more, available profit margin would be less, also the sales are dependent upon the prices, which in turn depend on cost.

## 5 Conclusion

This research adds a novel dimension to the cost of quality theory by generating a new way of listing CoQ factors and using the soft systems methodology. SSM is a potential technique for decision makers and a complex scenario. The decision makers in the businesses deal with a pluralistic view, like cost-benefit trade-off. Apart from the trade-off, the presence of the multiple factors and multiple relation based-linkages among the factors create a complex scenario. Since the base elements in the digraph have high driving power, this research can help the management decision-makers in the manufacturing industries to focus and work upon to improve the base factors of the model, which ultimately decide the functioning elements at above levels. The limitation of this paper is that the digraph development process does not give any weight to the identified CoQ factors, which could have been statistically evaluated using methods such as structural

equation modelling (SEM). This may be expanded in the future studies along with the development of statistical models.

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# An Overview of the Skill Development Programmes for Women Entrepreneurs in India

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## **ABSTRACT**

*One of the major development programs undertaken by the Government of India to enhance the skill is "Skill India". The toughest challenge is skilling of women than that of men. The oldest scheme introduced by Government to upgrade the skills of women is "Support to Training and Employment Programme" for women. This was implemented in India in 1986. The women entrepreneur through enriching their knowledge with adequate skills makes them to become self-dependent. But due to several problems like lack of support from their family members, lack of finance, lack of confidence and social dogmas in society, the women entrepreneurs have not been successful to run their enterprises. This paper highlights the fact that women entrepreneurs must be empowered to upgrade their status in the society. To attain these objectives women must be imparted with adequate skill development programs. Through empowering the women entrepreneurs, there would be development of family, society and country as well.*

**KEYWORDS:** Skill India, women entrepreneurs, skill development programmes, women empowerment

## **1. INTRODUCTION**

In order to develop the economic conditions of the citizens of the country, every government initiates various programs related to the field of social upliftment, employment, electricity, health and education. The citizens must also be imparted the required skills to enhance their skills which is needed to run their enterprises. The oldest scheme related to enhance the skill is the "Support to Training and Employment Programme" for Women (STEP). It was introduced in 1986 in India. This was introduced by the Ministry of Women and Child Development. The toughest challenge is skilling of women than that of men. This article can be sub divided into six sub topics.

First it deals with women of India. Women have performed multiple tasks since centuries. They play the role of mother, sister, daughter, and wife. But they are deprived of certain things in life. They have no formal education, they are psychologically and physically attacked by men, most of the women commit suicides due to the existing social evil called dowry, and they are deprived of proper economic status in the society. Second, it considers the women entrepreneurs in India. Women entrepreneurs can play a prominent role in reducing the level of poverty. Hence, there is a need to create more employment opportunities for women entrepreneurs to boost their status in the society. Third it



discusses the problems faced women entrepreneurs in India. Women are always neglected in society. Due to various factors relating to social, political and cultural reasons, the skills of the Indian women entrepreneurs has not been harnessed properly. Fourth, it describes the skill development programmes in India. In order to impart the required skills to its citizens, the government introduced a campaign called “Make in India”, “Skill India”. The main aim of introducing Skill India is to train forty crore people by 2022. Skill development programmes helps to improve the self-entrepreneurships and self-development amongst the young population. Fifth, the paper analyses the need for imparting skill development programmes for women entrepreneurs in India. Training and developing the skills of women entrepreneurs are needed in India to help the women entrepreneurs to have innovative ideas and channelizing those ideas into business activities. Finally it reviews the impact of skill development programs on women entrepreneurs in India. Through vocational education and training and also through developing the entrepreneurial skills, there is a wide expansion of women entrepreneurship in the economic development of the country.

Fig 1: Skill India was introduced in India by the Government for empowering the youth of India. This has enabled them to be more productive and more employable towards their work. Before 2009, for a period of five decades, vocational training was the main institutions. The Pradhan Mantri Kaushal Vikas Yojana was launched in 2015. The main objective was to enable the Indian youth to get training to enhance the skills thereby enabling a better livelihood. After the success of PMKVY, PMKVY (2) was introduced for a period of 2016-20. The main components of the scheme were short term training, recognition of prior learning and special projects.

## **2. WOMEN OF INDIA**

Women in India have occupied a prominent role in the society. Though Vedas has stated that women play multiple roles comprising of the characters as mothers, sister, daughter, wife; still they have been completely suppressed in the Indian society. Women have been facing domestic violence along with emotional and mental trauma (Mangoli & Tarase, 2009). After liberalization of India, there has been a good employment facilities opened for not only for men but even for women as well. But still women are not enjoying a good economic status in managerial activities in India. Hence a study has been conducted to initiate the practitioners to enhance the women of Indian economy (Budhwar et al, 2005). Since many reforms are taking place in financial and economic areas of India, there is an expansion of markets in India. Though the financial programs are implemented on one side; on the other side women are lagging behind in financial literacy. Hence it becomes imperative to impart financial literacy activities to women to enable them to become literate in this area. This would enable the woman to become more confident and empowered which accelerates in improving the economic growth of the entire country (Baluja, 2016). In India the practice of dowry is still prevalent in 21<sup>st</sup> century. Though there are many laws to prevent the practice of dowry, still there is not much change during the past 30 years. In 2011, there were 8,618 female deaths owing to the disputes relating to dowry. Though there has been a sincere effort by feminists’ organizations, social activists and Indian government to protect the women from being traumatized due to dowry issue, still there are high rates of mortality among women living in India (Banerjee, 2014). 30.4 percent of women did not receive formal education and husbands of the women were highly educated than their wife. Most of the women were living in one-room. Sometimes the women were kicked, beaten, hit, slapped by their spouse. Nearly 30 percent of women were physically assaulted by their spouse who needed medical care (Jain et al, 2004).

Fig 2: The Indian women have been playing a different role in the society. She is a mother, sister, daughter and also a wife. Most of the women in India are devoid of formal education. After marriage she is facing many atrocities if she is not able to pay the dowry. Due to this, she is being kicked, beaten, hit and slapped by her spouse. Thus, she does not get a good economic status in the society.

### **3. STATUS OF WOMEN ENTREPRENEURS IN INDIA**

India occupies the 5<sup>th</sup> place in women entrepreneurship compared to all other countries of the world. With respect to Gross Domestic Product (GDP), it stands at the third position with rest of the other countries of the world. After liberalization, nearly 250 million people in India have become entrepreneurs. According to Global Entrepreneurship Monitor (GEM) Report, 2002, India has occupied the second position with respect to the entrepreneurship activity and out of this; nearly 14.1% were women entrepreneurs in India. In India there are three kinds of women entrepreneurs namely “chance”, “forced” and “created” on the basis of how the women entrepreneurs started their business. Chance entrepreneurs have no clear plan or goal to start their business. Forced entrepreneurs are compelled to start their business owing to the circumstances which might be financial problem or death of her spouse etc. Created entrepreneurs are those who are highly motivated, encouraged, properly located and developed viz, Entrepreneurship Development Programmes. The females in South India are mainly involved in ready-made garment, pickle making, bakery, coir manufacturing, handicrafts, book binding and others (Ghosh et al, 2007). Though reforms were introduced in India for providing employment opportunities for women entrepreneurs, the results were not satisfactory. More of the women entrepreneurs were employed in informal or unorganized sector (Ghani et al, 2014). Most of the female workers are involved in financing by themselves where they have their own petty account enterprises. Also these enterprises do not have hired labourers and are functioning within their own household surroundings. Some of the women entrepreneurs are even operating without a fixed location. Most of them lack proper access to the infrastructure facilities. This shows that women entrepreneurs start their businesses not by opportunity basis but they are necessity driven (Chakraborty & Chatterjee, 2021). Of late now the government is taking adequate measures to encourage the women entrepreneurs in India. Most of the women started their petty entrepreneurial activity to give a helping hand to their family members. But these entrepreneurial activities are not fruitful in a long term perspective. Hence women entrepreneurs must be given proper stimulation in the field of business. They must be educated as to how to improve their capacities which would lead to an effective business administration. This would improve their choice-making decisions and can expand their business in a decent manner (Haq et al, 2021). Malika Das has studied the status of women entrepreneurs in the states of Tamil Nadu and Kerala. She found that the obstacles which the women entrepreneurs faced was quite similar to those women entrepreneurs dwelling in Western countries. The rate of conflicts relating to work-family issues was lower than the western countries. Initially women played the role of wife and then mother. Women take up the initiative of taking care of managing the household activities, nourishing her child which most of the times lead to conflicts in work family matters. The study confines that 100 percent of the women entrepreneurs started their private limited enterprises which was owned by themselves, 31 percent partnership was with their spouse and 44 percent of the family members were their common partners (Das, 2000). Today most of the women entrepreneurs are participating actively in new avenues in India. The main reasons for

women in running their enterprises are their talents, skills, knowledge and their abilities and zeal to perform something positive (Dhameja, 2002).

Fig 3: According to Global Entrepreneurship Monitor (GEM) Report, 2002, India has occupied the second position with respect to the entrepreneurship activity and out of this; nearly 14.1% were women entrepreneurs in India. There is a high demand for empowering the women entrepreneurs in India. The government is taking initiatives to empower the women entrepreneurs. This enables them to enhance their skills, knowledge and abilities. Thus these women entrepreneurs can become self-dependent through their talents thereby promoting their productivity.

### **3.1 PROBLEMS FACED BY WOMEN ENTREPRENEURS IN INDIA**

In India though there are very few women entrepreneurs, they are performing their level best to sustain themselves in the society. In India it is always the male who dominate the society and hence women entrepreneurs are often neglected in the society. Most of the women are doing business on a small scale (Rajvanshi, 2017). If a country has to develop, then it has to concentrate on developing the human resources. If there has to be a socio-economic development of any country, then women must be given equal priority as that of male population. Due to various factors relating to social, political and cultural reasons, the skills of the Indian women entrepreneurs has not been harnessed properly. At the same time even the women entrepreneurs lack the economic, social and motivational support from their family members and also even from the society as well (Sharma & Chakraborty, 2019). Compared to other countries of the world, Indian women entrepreneurship is very low, that too in rural areas. Most of the middle-class household women are not ready to take the role of an entrepreneurship due to fear of social dogmas existing in the society. Rural women are playing a major role in household work and looking after their kids. Most of the economic conditions of women are pathetic those dwelling in the rural areas and they earn very less due to low opportunities (Sharma & Gaur, 2020). Entrepreneurship plays a major role in the economic development in India. Most of the women entrepreneurs are facing the problem of maintaining a balance in their work life. Due to family responsibilities, most of the women face lots of conflicts to strike a balance between their personal life and work. So to maintain a balance between personal and their work, they initiate their own activities relating to the business. Hence through their business activities, they create job, innovative ideas leading to economic development of the country (Agarwal & Lenka, 2015). There are four components which impair the businesses of women entrepreneurs namely competition in the business, lack of family support, lack of awareness about the programs offered by government to empower women entrepreneurs, society dominated by males, shortage of raw materials, lack of support from the family members, attitude of taking low risk towards business, problems related to finance, lack of management skills, low confidence level and problems relating to marketing (Bawa & Ismail, 2016).

Fig 4: Many women entrepreneurs of India face many difficulties to start off their enterprises. Some common reasons are lack of support from their family members, lack of awareness, no up gradation of skills, lack of finance, lack of confidence, lack of management, and social dogmas in society and difficulty in maintaining a balance in their work life.

### **4. METHODOLOGY**

The different sources from which the data are collected are through secondary sources mainly journals, magazines, books, Ministry of State for Skill Development and Entrepreneurship Reports and also through DOAB.

## **5. SKILL DEVELOPMENT PROGRAMMES IN INDIA**

As the economic environment is changing, there is a necessity to impart and promote the skills of youth of the country. Though there is a focus on education amongst the youth, still there is a deficiency of skilled manpower in our country. Hence there is a need of introducing skill development programmes in India (Sharma & Sethi, 2015). Compared to all the other countries of the world, the largest provider of labour force is India. But due to lack of adequate knowledge and skills, most of the people in India are not able to get the required jobs. Singapore and China are far ahead in imparting the required skills to its citizens compared to that of India. Hence in order to achieve this objective the government introduced a campaign called “Make in India” (Prakash, 2017). Youth plays a major role in the economic development of the country. Hence there is a necessity to improve the skills. For this purpose the Government of India introduced Skill India. The main aim of introducing Skill India is to train forty crore people by 2022. Majority of the youth in India are unaware of the modern technologies which are very much needed for the economic development of the country. Skill development programs help to improve the self-entrepreneurships and self-development amongst the young population. Skill development programs provide loans at very low rate of interest to young population (Pandey & Nema, 2017). The Government of India has stressed on Skill Development programmes few years back. Around 2.4 percent received vocational training and education in 2004-2005. But this ratio reduced by 2 percent in 2009-2010 amongst the youth of age between 15-29 years. Still there is a high rate of unemployment in India (Agrawal, 2014). There are many employability skills such as ability to solve the problem, self-understanding, leadership, general management and better communication amongst the youth of India. Being competent in one skill does not mean that the person is well competent enough in another skill. Hence there is a necessity for the workers to be having the quality of multi-tasking in order for gainful employment (Gowsalya & Kumar, 2015).

Fig 5: Of late the government of India has introduced many skill development programmes in India especially for uplifting the women entrepreneurs. Due to this the women entrepreneurs have enhanced their knowledge, competence and experience. This has enabled them to attain growth with respect to their entrepreneurship.

### **5.1 NECESSITY FOR IMPARTING SKILL DEVELOPMENT PROGRAMMES FOR WOMEN ENTREPRENEURS IN INDIA**

Entrepreneurship plays a major role in changing the economic scenario of the country. Hence in order to sustain for a healthy economy, entrepreneurial skills are necessary to ameliorate the quality of life not only for communities but also for families and individuals. Though the Government has enunciated many skill development programs for entrepreneurs, still the recipients are facing difficulty in availing it. Thus, the women entrepreneurs must be provided with intensive training to remove the rural poverty. The need of the hour is implementing the integrated development programs in the rural areas (Bahl, 2012). Entrepreneurship leads to creation of additional wealth. Through entrepreneurship there is a tremendous change in the magnitude of national economies, markets or industries. Hence if the nation has to develop, then it is important to provide required education to the women entrepreneurs. Currently, women entrepreneurs are providing employment not only for themselves but also for others. Hence it is the duty of

the Government to frame proper planning for developing the women entrepreneurs. This will help in reducing the poverty (Kain & Sharma, 2013). The term “Skill Development” refers to training which is being imparted by the Government or institutions to improve the efficiency, quality and skills of the entrepreneur working for the organization. Government in order to provide a boost for women entrepreneurs has introduced various schemes such as “Stand Up India”, “Make in India” and “Start Up India”. There is a need for skill development programs in order to accelerate the socio-economic status of women entrepreneurs (Sawale & Karpe, 2019). Training and developing the skills of women entrepreneurs are needed in India to help the women entrepreneurs to have innovative ideas and channelizing those ideas into business activities. Women entrepreneurs find it extremely difficult to train and equip themselves with the changes taking place in the technology market. By providing necessary training and skills through various programs, would aid the women students to set up their businesses. Women entrepreneurship also acts as a tool for uplifting the socio-economic status and also alleviating poverty amongst the people (Bhardwaj, 2014). Through training programs there has been a women empowerment economically. Many women entrepreneurs of India have become very successful in both socio-economic fields relating to entrepreneurship. This has led to a change in the demographic characteristics thereby reflecting a tremendous economic growth in India. Due to this the Indian Government has initiated National Skill Development Mission and National Skill Development Policy in 2009. The purposes of introducing these programs are to impart entrepreneurship development, skill training and vocational education to the existing emerging women work force of India (Kaviarasu, Ruban, & Francis, 2018).

Fig 6: The main reasons as to why women entrepreneurs have to be empowered are because this enables them to develop innovative ideas thereby uplifting their socio-economic status. This allows them to alleviate from the problem of poverty. Through the integrated development programs in the rural areas, most of the women entrepreneurs could accelerate their status thereby promoting them for empowerment leading towards economic growth.

## **5.2 TYPES OF SKILL DEVELOPMENT PROGRAMMES IN INDIA**

In order to impart various skill development programmes, the Government of India has established State Small Industries Development Corporations through the Micro, Small and Medium Enterprises Development organizations. Those women entrepreneurs who are encountering specific problems women cell has been constituted through the Office of DC (MSME). The prominent schemes under Ministry of MSME are:

1. Trade Related Entrepreneurship Assistance and Development (TREAD) Scheme for Women.
2. Incentives to women Entrepreneurs Scheme, 2008 which provide financial support through financial institutions and banks.
3. For developing the women entrepreneurs various States has initiated Swayam Siddha Schemes.
4. To provide training facilities to women entrepreneurs, Support to Training and Employment Programme has been established.
5. Mahila Coir Yojana Schemes of Ministry of Women and Child Development.

### **5.3 IMPACT OF SKILL DEVELOPMENT PROGRAMMES ON WOMEN ENTREPRENEURS IN INDIA**

Due to economic liberalization and globalization, women entrepreneurship is attaining popularity in India. Through vocational education and training and also through developing the entrepreneurial skills, there is a wide expansion of women entrepreneurship in the economic development of the country. This has enabled the women entrepreneurs to become self-directed, self-disciplined and highly motivated. Through empowering the women entrepreneurs, there would be development of family, society and country as well. This has opened up new horizons for employment opportunities to both men and women (Mishra & Kiran, 2012). Entrepreneurial learning happens due to several factors. It may be due to social, personal and environmentally motivational factors. Through entrepreneurial learning there would be development of entrepreneurial, managerial, social and personal competencies. These competencies play a major role in functioning of a business enterprise (Lenka & Agarwal, 2017). Women entrepreneurs have to encounter obstacles than men in developing resources for human capital and also for starting their enterprises. Entrepreneurial education includes varieties of skills, competencies and knowledge for initiating the activities relating to enterprise (Guerrero & Richards, 2015). Women entrepreneurs are provided with training and vocation education in the era of globalization and liberalization. Through these facilities, women entrepreneurs have become economically empowered. Government of India has introduced National Skill Development Mission and National Skill Development Policy in 2009. The purpose of introducing these schemes is mainly to provide entrepreneurship development, vocational education and skill training to the existing labour force. Since now, women are participating in the functioning of an enterprise which has led to economic growth and a change in the demographic infrastructure of business. Due to this, the women entrepreneurs are now playing an active role in the development of the country (Khare, 2019). Women entrepreneurs through their education have enabled them to face the competition against male entrepreneurs. This has helped them to sustain the economic growth and social development (Garg & Agarwal, 2017). Women entrepreneurs are always applauded for their accomplishments in their prospective field. She has withstood the competition with that of men and has successfully walked along with men even in business as well. These women entrepreneurs are persuasive, assertive and ready to take risks. Through their hard work, perseverance and diligence they are able to face cut throat competition with men (Koneru, 2017). Women entrepreneurship programme has been introduced to enhance the business and entrepreneurial skills to boost the female entrepreneurs. An analysis was conducted to find out the impact of women entrepreneurship programme. Accordingly 116 women participated in this programme whereas 64 women did not participate in the women entrepreneurship programme. The results of the study found that through enrolling in women entrepreneurship programme women gained new skills and adequate knowledge to carry out their business activities. This has boosted their confidence level in starting their business activities and using these skills they can maintain a substantial growth in their ventures (Botha, Nieman, & Vuuren, 2006)

Fig 7: Due to skill development programs, women has been playing a pivotal role in increasing the human capital, develop an excellent managerial, social and personal competencies. This boosts their confidence, thereby enabling to face competition. Finally they become an asset not only for their family but also for society and country as well.

## **6. ANALYSIS AND INTERPRETATION**

From table 1 we can see that compared to men the numbers of female candidates enrolled in different schemes are very low. The highest numbers of trained candidates are in Pradhan Mantri Kaushal Vikas Yojana.

From table 2 we can see that every year there is a hike in the number of candidates in it is in our country. But compared to women, men have enrolled to the highest level in all these years.

From table 3 we can see that only in 2014-15, the male candidates have outsmarted the females in enrolling in non-engineering trades in it is. But after that, there is a considerable progress in enrolment by females in non-engineering trades enrolment in it is which is a positive sign.

## **7. CONCLUSION:**

For a country like India in order to attain sustainable growth it is equally important to promote both job-seekers and job – creators. In 2015, Shri Narendra Modi introduced the National Skill Development and Entrepreneurship policy. Women must be empowered with the right knowledge of entrepreneurship. The core area of “Aatma Nirbhar Bharat Abhiyan” is “entrepreneurship, skill and start-up”. If women become self-reliant in the skill of entrepreneurship, it opens up more avenues for them to avail employment opportunities thereby raising the prosperity of the nation. Hence there has to be a provision of transforming the women entrepreneurs into productive assets within a short span involving interventions in the field of entrepreneurship. The young female entrepreneurs must be channelized for creation of more wealth through their skills which helps them to progress in the society. For young women entrepreneurs, it is the duty of the government to provide a conducive environment and help them in developing their enterprises. While providing small loans to women entrepreneurs, the government must also see that these women entrepreneurs are provided with adequate social protection and also tax relief for the setting up the enterprises. Women must be given a proper status in the society. They must be given the right to demand for their rights and freedom. Women entrepreneurs have a major role in alleviating the problem of poverty. Hence there has to be a wide opportunities opened to them. They have to be given equal status and benefits to be on par with men. Hence it is the need of the hour to improve the skill training facilities covering wider area of women entrepreneurs in India. Thus, women entrepreneurs can become a major contributor to uplifting the Indian economy. It is only with this perspective; India can harness the talent and potentiality of the budding women entrepreneurs.

## **ACKNOWLEDGEMENT**

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## **APPENDIX 1**

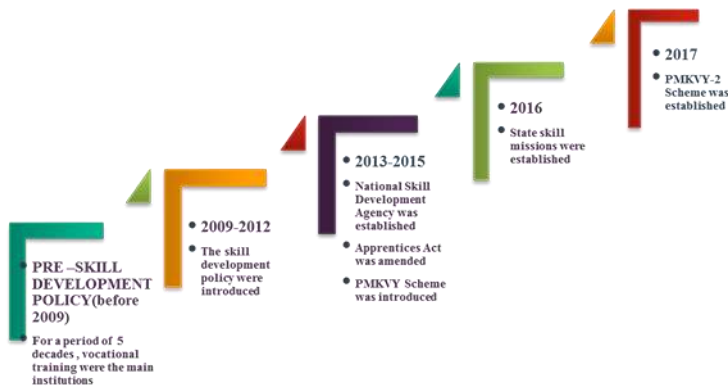


FIG 1: Evolution of Skill Development Programmes in India

## APPENDIX 2

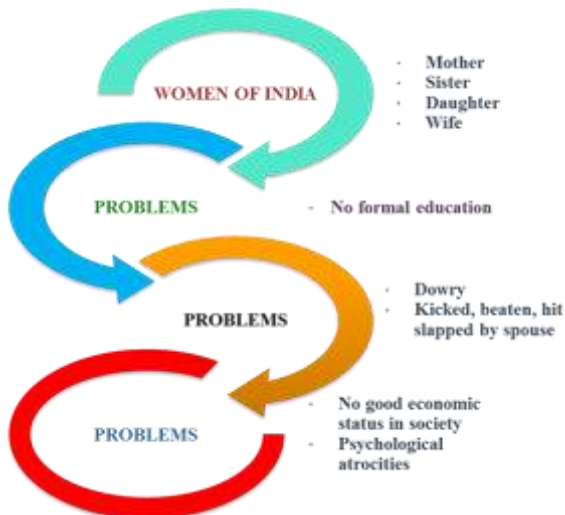


FIG 2: Status of Women in India

## APPENDIX 3



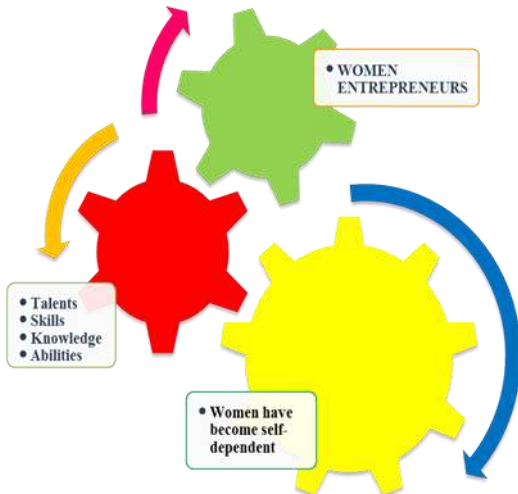


FIG 3: Women Entrepreneurs in India

**APPENDIX 4**

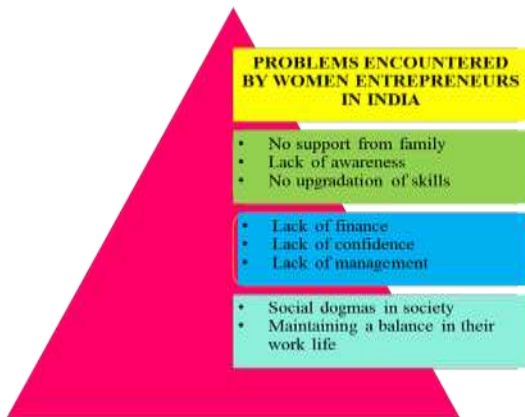


FIG 4: Issues faced by women entrepreneurs in India

**APPENDIX 5**



FIG 5: Impact of skill development programmes in India

**APPENDIX 6**



FIG 6: Need for imparting skill development programmes for women entrepreneurs in India

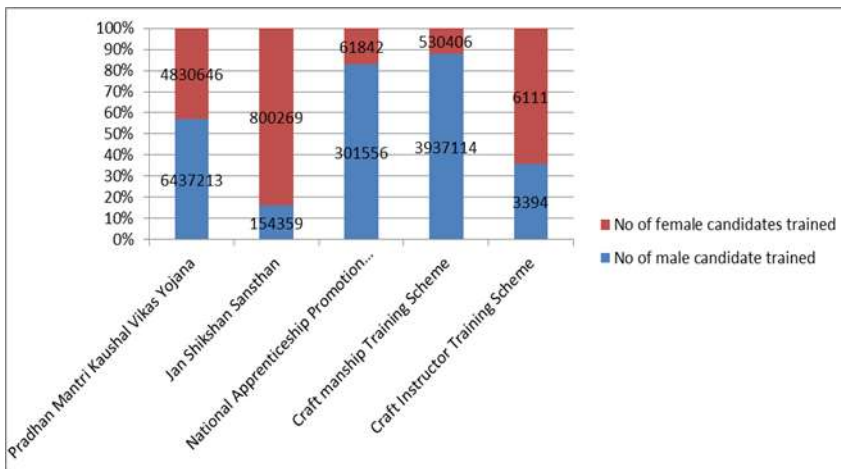
**APPENDIX 7**



FIG 7: Impact of skill development programs on women entrepreneurs in India

**APPENDIX 8**

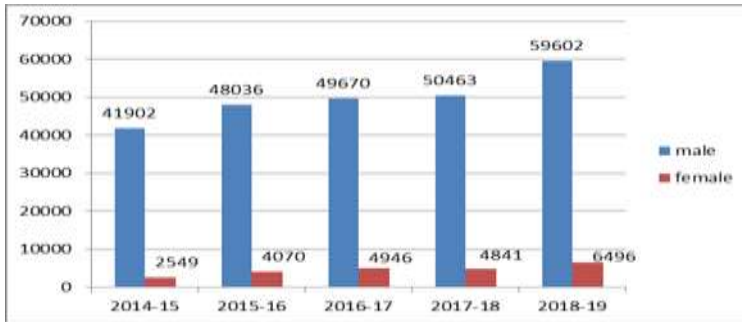
**Table 1: Graph showing the different schemes in India involved in training the male and female candidates**



Source: Ministry of State for Skill Development and Entrepreneurship, December 2021

**APPENDIX 9**

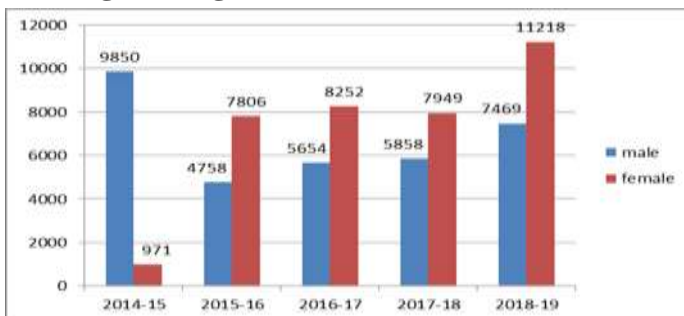
**Table 2: Graph showing the enrolment of male and female candidates enrolled in engineering trades in ITIs**



SOURCE: author's findings

## APPENDIX 10

**Table 3: Graph showing the enrolment of male and female candidates enrolled in non-engineering trades in ITS**



SOURCE: author's findings

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# Quality of education and employability skills among Management graduates in Bangalore rural District

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## **Abstract**

*In light of the widening gap between the expectations of employers and the skill sets possessed by employees, it is very necessary to investigate ways in which the educational standard at management schools may be improved. Faculty members from select Management Institutions in Rural Bangalore were selected for the study with convenience sampling. The population for the study were obtained from the official website of the relevant government agency, and the sample size will determine by applying the Cochran formula to the Known Population. The data was collected from 114 respondents with the use of an appropriately constructed questionnaire and previous research on the topic of the quality of education and employability abilities. SPSS and AMOS (tools) will utilized for the study; EFA and structural modelling will also performed (Techniques). As a result, recommendations will be given to the management at both the micro level and the macro level to place an emphasis on the necessity of quality education in management institutions*

**Keywords: Quality of Education, Employability Skills, Management Graduates**

## **1. Introduction**

Education is a signal that shows the humankind the correct way and course to flood ahead. It is the foundation of any general public as it assumes an essential job in the advancement of the country. The Indian Higher Education division is considered as one of the biggest working frameworks in the nation and is the second biggest training framework on the planet. The Management education has multiplied everywhere throughout the nation in advanced education for preparing future business pioneers. In the advanced financial situation "The Management" is treated as a surge of education and preparing that can immediately affect the activities of any business. The field of Management is dynamic in nature and requires imaginative critical thinking instruments and methods to comprehend different useful exercises in the association to improve its proficiency, viability and benefit of any association. Today, the business condition is experiencing a transformation. Constant changes in the economy and data innovation, alongside the speed of progress, expect administrators to be constantly occupied with a learning procedure. Innovativeness and modernization in the inexorably serious economic condition are viewed as the motor of fast economic development.

## **2. Review of Literature**

Jagadeesh (2000) The quality issue in management education with the recent conflicts is examined , the researcher discusses the Organization structure of Higher education in

Management in India as per the guidelines of the regulatory bodies who are governing management education in India. The researcher further suggests feasible ways to enhance the quality of education.

Marimuthu & Mukherjee (2014) Projects and internships are one of the imperative tools which lead to employability skills of the students. In the contemporary era, Placement department is the significant part of the management institutions. This department works towards enhancing the employability skills of the students. The out-bound training practices help students to acquire skills required by the current Industry.

Balaji (2013) Business and management institutions produce qualified students who are the future of the nation either through entrepreneurship or by serving the IT and administration sectors. Therefore, there is a need to match the quality and the cost of education to develop the individual skill sets. The researcher suggests that creative and innovative pedagogy should be included in the curriculum design and improve the quality through other methods.

Manjule and Pandhe (2014) the researcher acknowledged that the total quality management, bench marking and re-engineering tools have improved the businesses and various industries across the globe. Therefore, the author suggests the management institution to take the benefits of the TQM techniques to improve the quality of education and filling the gap between the expectations of the employer and skills of the students.

### **3. Statement of the Problem**

There are numerous Management institutions in India, but unfortunately, the state of management education in the country is not very satisfactory (Datta, 2016). There is a mushrooming growth of management institutes but the quality of education and management graduates is decreasing day by day (Rao, 2009). With increasing discrepancies between employer expectations and employee skill sets, it is imperative to find out how quality of education can be enhanced in Management institutions. There are various responsible factors which influence the quality of education and employability skills, if such factors are identified the management Institutions can strive to fill this gap.

### **4. Research Objectives**

- To study the need for Quality of education and employability skills among management students
- To identify various factors contributing to Quality of education of the management students
- To assess factors that influences the employability skills of the management students

### **5. Research Hypothesis**

**H01:** External factors and internal factors do contribute to factors influencing Quality of Education

**H02:** Projects Internships, Extra Curricular, Effective Mentoring, Publishing Journals and Digital library do not enhance employability skills

### **6. Sampling**

The study uses convenience sampling technique to select the respondents under study across Management Institutions of Bangalore. The population of the study is referred from the Government website and sample size is calculated using the Cochran's formula of Known Population. As per the AICTE website, as on 2018-2019 there are 219 management Institutions in Karnataka with 3019 faculty members. There is no data available based on the districts so the population base is taken as 3019.

Cochran Formula to find out the sample size:

Cochran introduced a formula to calculate the sample size when Population is known

$$n = \frac{\frac{z^2 * p(1 - p)}{e^2}}{1 + \left(\frac{z^2 * p(1 - p)}{e^2 N}\right)} = \frac{\frac{1.959964^2 * 0.5(1 - 0.5)}{0.09^2}}{1 + \left(\frac{1.959964^2 * 0.5(1 - 0.5)}{0.09^2 * 3019}\right)}$$

Equation.....1

The above equation shows the formula of determination of sample size for the study. The confidence level is taken at 95%, p= 0.1 and the expected error is 0.09 or 9% and the population size is 3019, The result sample size derived from the eq.1 is 114.871. Therefore samples of 114 faculties from different institutions across Bangalore rural are taken as respondents for the study.

## 7. Data Collection

The data is collected with a well-structured questionnaire which design with 3 parts. Part –A is on the demographic profile, Part-B and Part-C had likert scale questions based on quality of education and employability skills. The confidentiality of the responses is highly maintained.

## 8. Analysis and Interpretation

### 8.1 Demographic Features of the faculty members

The demographic Profile of the respondents reveals that a majority of 57.9 percent of the faculty is male and remaining are the female faculty members, 71.9 percent faculty members had completed Post graduation and 28.1 percent Academicians are Doctorates. 71.9 Percent faculty members are Assistant Professors, 19.3 percent respondents are Associate professors and a very small proportion of respondents are teaching associates and Head of the departments.

### 8.2 Awareness of the respondents about quality of education and Employability skills

When enquired about the familiarity with the terms 'Quality of education' and 'Employability skills' a mean score of 4.63 indicating strong agreement with a standard deviation of 0.553 which shows that there is no much variation in the responses of the Faculty members in relation to awareness. Hair and et al, 2007 agreed that -1 and +1 is the acceptable limit for Skewness and -1.5 and +1.5 for Kurtosis. The skewness is negative which indicates that responses are aligned towards the right indicating agreement to strong agreemnet range of responses.



Also when enquired about Quality education can lead to Employability skills , a mean score of 4.53 is obtained indicating agreement to strong agreement range of responses with least standard deviation 0.568. The skewness and kurtosis are under the acceptable limits.

### 8.3 Factors influencing Quality of Education

With the extensive study of previous studies on the topic the researcher identified 8 factors that influence the quality of education. Exploratory factor analysis is run to identify the constructs in which each of these factors can be loaded.

**Table 1 -Descriptive statistics of the Quality of Education**

Descriptive Statistics					
	N	Mean	Std. Deviation	Skewness	Kurtosis
	Statistic	Statistic	Statistic		
Curriculum design can enhance the quality of education	114	4.23	.729	-.940	1.273
Do you agree that Industry inputs to be considered while designing the curriculum?	114	4.39	.723	-.737	-.741
Good infrastructure is essential in boosting our quality of education	114	4.18	.732	-.562	-.024
Do you agree that UGC and AICTE guidelines will help the institute to deliver quality inputs to students	114	4.09	.735	-.411	-.225
Institutional strategy and design can form a basic parameter of the quality of education	114	4.25	.686	-.694	.666
Seminars and management-related activities are essential to increase the quality of education	114	4.28	.588	-.150	-.526
Workshops and symposiums lead to better result in the quality of education	114	4.28	.588	-.150	-.526
Industrial visits and interactions between the students and industry experts have a good impact on the quality of education	114	4.49	.682	-1.333	1.825

The mean score of all factors influencing Quality of Education are above 4.00 indicating agreement to strong agreement opinions on the statements; the standard deviation is also below 1.00 showing that there is no much deviation in the opinions of the faculty members. The skewness is negative which signify that the responses are left tailed which are towards strong agreement. The Kurtosis is within the acceptable ranges.

**KMO and Bartlett's Test**

KMO measure of sampling adequacy 0.745 and Bartlett’s Test of Sphericity are statistically significant at 5% level. Chi-square value of Bartlett testis 312.678 with the significant value less than 0.05 and 28 degrees of freedom, which suggests that correlation matrix, is not an identity matrix and that it appears to be factorable.

**Total Variance explained**

From the Total Variance analysis, it can be stated that the total variance of the set of inter-related items are extracted to identify the underlying dimension in the data set by Principal Component analysis of Extraction with Varimax and Kaiser Normalization for factor rotation. The cumulative percentage of extracted sums of squared loadings is 56.890%. 2 factors are identified by using the stated method of Factor Analysis.

**Rotated Component Matrix**

All 8 items under the study have factor loadings above 0.30, therefore all 8 items are loaded on 2 dimensions. The first dimension – External Factors influencing Quality of Education has four items and second dimension – Internal Factors influencing Quality of Education has loaded four factors.

**Table 2 – Rotated Component Matrix**

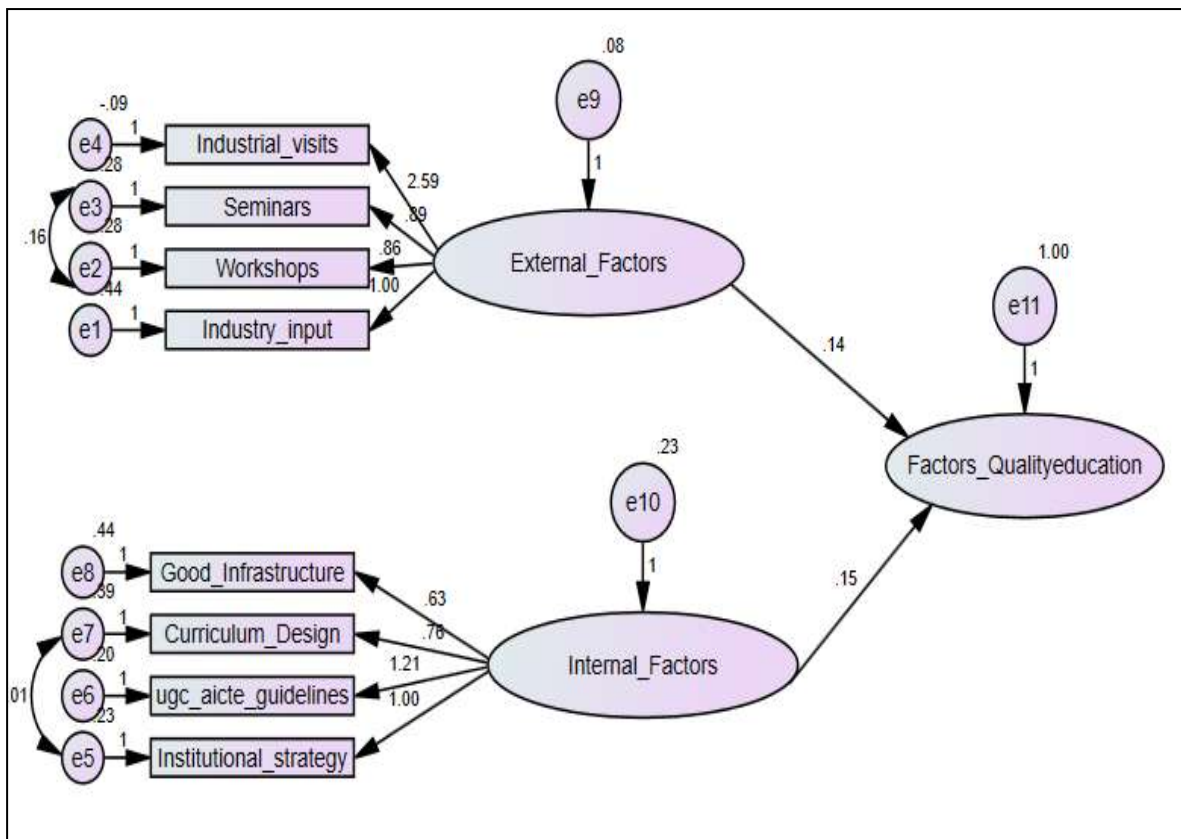
<b>Rotated Component Matrix<sup>a</sup></b>		
	Component	
	1	2
17. Industrial visits and interactions between the students and industry experts have a good impact on the quality of education	0.866	
15. Seminars and management-related activities are essential to increase the quality of education	0.724	
16. Workshops and symposiums lead to better result in the quality of education	0.652	
4. Do you agree that Industry inputs to be considered while designing the curriculum?	0.551	
7. Good infrastructure is essential in boosting our quality of education		0.856
3. Curriculum design can enhance the quality of education?		0.834

10. Do you agree that UGC and AICTE guidelines will help the institute to deliver quality inputs to students		0.777
11. Institutional strategy and design can form a basic parameter of the quality of education		0.623
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

### Confirmatory Factor Analysis

A measurement model was initiated to validate the scales of the study and confirmatory factor analysis (CFA) was conducted to test the measurement model. The fit of the model was evaluated based on the fit indices namely goodness of fit index (GFI) and the root means square error approximation (RMSEA). From the output of CFA, the model fit the data well because Chi-Square value of 1792.302 with 33 NPAR is statistically significant since the p value is 0.00. Its Goodness of Fit Index (GFI) = 0.821 and Root Mean Square Error Approximation (RMSEA) = 0.0646 which are all under the acceptable limits.

**Figure-1: CFA –Factors influencing quality of Education**



The structural relationship of the External and Internal factors with factors influencing quality of education is shown in the above picture. As the Internal Factors go up by 1 the factors influencing quality of education goes up by 0.146 and as the external factors go up

by 1 the factors influencing quality of education goes up by 0.139. There is a statistically significant contribution of External and internal factors to factors influencing quality education. Industrial visits contribute to external factors by ( $r=2.591$ , S.E 0.160, C.R=2.233 and  $p=0.000$ ) and UGC and AICTE guidelines contribute to internal factors by ( $r=1.207$ , S.E .322, C.R=3.749 and  $p=0.000$ )

**As there exist a positive impact of external Factors and internal factors on quality of education, Null hypothesis of *H01: External factors and internal factors do contribute to factors influencing Quality of Education is rejected***

#### 8.4 Factors influencing employability skills

From the review of literature five items are identified from the review of the literature, all the five items have factor loadings above 0.30 and hence the confirmatory factor analysis is run on the five items to see how much each contributes to the employability skills.

**Table – 3 Descriptive statistics – Employability skills**

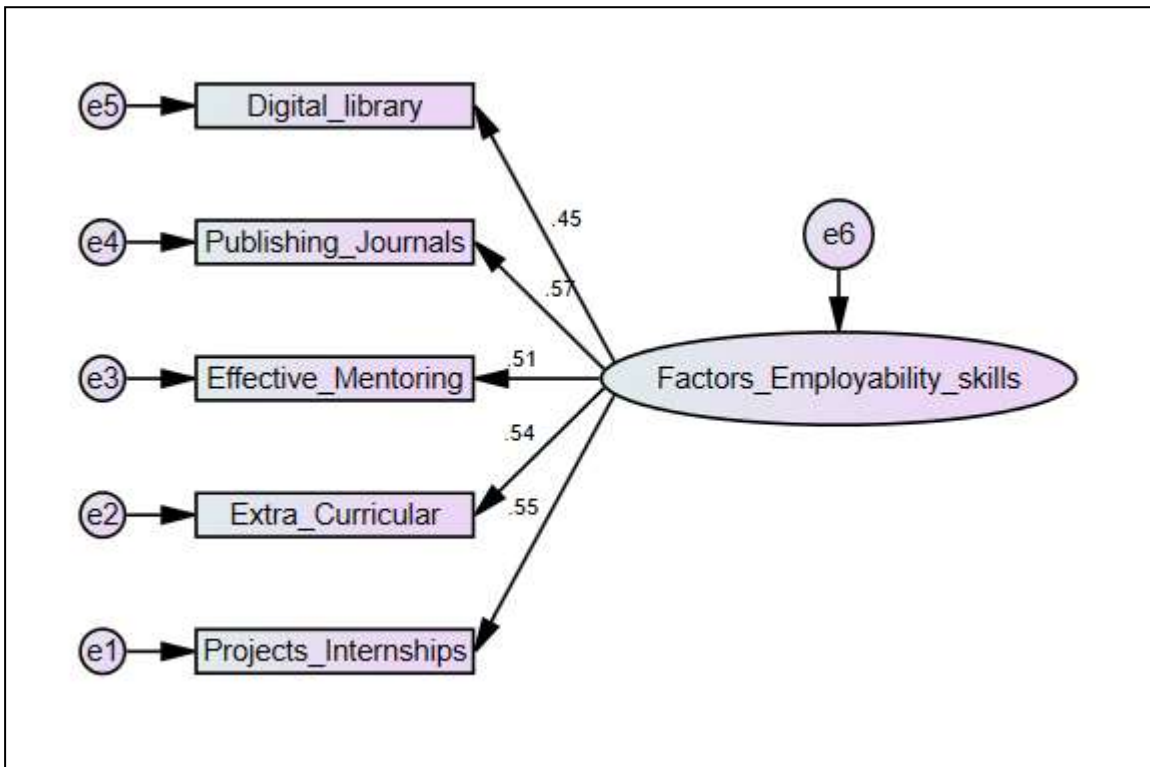
Descriptive Statistics			
	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
Digital library can be a crucial parameter for developing employability skills	114	3.96	.902
Publishing journals regularly has a positive impact on fostering better employability skills	114	4.05	.714
Effective mentoring scheme plays a key role in the development of the quality of education	114	4.44	.565
Extra-curricular activities can improve the employability of management student	114	4.42	.593
Projects and Internship programs provide practical exposure and foster employability skills	114	4.63	.642
Valid N (listwise)	114		

The mean score of all factors influencing Employability skills are above 4.00 indicating agreement to strong agreement opinions on the statements; the highest mean score is for effective mentoring and Digital libraries are not much agreed upon. The standard

deviation is also below 1.00 showing that there is no much deviation in the opinions of the faculty members. The skewness is negative which signify that the responses are left tailed which are towards strong agreement. The Kurtosis is within the acceptable ranges

From the output of CFA, the model fit the data well because Chi-Square value of 151.302 with 10 NPAR is statistically significant since the p value is 0.00. It Goodness of Fit Index (GFI) = 0.919 and Root Mean Square Error Approximation (RMSEA) = 0.0781 which are all under the acceptable limits.

**Figure-2: CFA –Factors influencing employability skills**



Project internships contribute to employability skills by 55% which is statistically significant at ( $r=0.551$ ,  $S.E =319$ ,  $C.R=3.600$  and  $p=0.00$ ). Similarly, Extra Curricular contributes by 54% ( $r=0.539$ ,  $S.E =257$ ,  $C.R=3.552$  and  $p=0.00$ ). Effective mentoring contributes by 51%, Publishing journals and articles contribute by 57% and digital library contributes the least by 45%. all 5 items are statistically significant at  $p=0.00$ .

**As there exist a positive impact of the above factors on Employability skills, Null hypothesis  $H_{02}$ : *Projects Internships, Extra Curricular, Effective Mentoring , Publishing Journals and Digital library do not enhance employability skills rejected.***

### 9. Findings and suggestions

- A majority of the faculty members are aware of the importance and need for quality education and also believed that quality of education may positively affect the employability skills of the students, therefore it is important for the Management at both micro level and Macro level to emphasize on the need for quality education in management institutions.

- The factors influencing quality education may be classified as External factors-Facilities or activities outside the college campus but supported by the management and Internal Factors are facilities or initiatives taken within the institution to improve and develop the student's education quality and employability skills. Both the factors contribute approximately equally. Therefore, there is a need for the management to focus on both internal and external factors in the institutions.
- The faculty members feel that Industrial visits which is an external factor and Following UGC guidelines which is an internal factor are most imperative for quality education in the institution. Therefore, Institutions are advised to lay more emphasis on the above activities to enhance their capacity of providing quality education to the students.
- The faculty members also expressed that Effective mentoring highly contributes to employability skills and Digital libraries are not much agreed upon, therefore, the institutions should focus on mentoring the students in learning employability requirements of the current Industry.

## **10. Limitations of the study**

The study is limited to the District of Bangalore and especially to the Management Institutions. Since the geographical spread of India is quite vast, and the number of management institutions are so many, resources in terms of instance and funds is limited, it is difficult for any one researcher to do justice to the research topic.

Further, for the same reasons stated above, the researcher has limited the study to only Faculty of the Management Institutions as the real problems of Quality of education and employability skills are reflective.

## **11. Scope for Further Research**

Since the current study is limited to faculty of Management Institutions in Bangalore district, there is scope to study the opinions of the students as they are the actual population who experience the impact of quality education and employability skills. The study could be extended to various geographical locations and other higher education institutions.

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# A Study on Different Factors Impact on the Work Life Balance of Teaching Women Employees in Higher Educational Institutions in North Karnataka

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**Abstract:** *Work-life balance is a crucial ingredient for each woman teacher. The around elements make them drop their original nature and thinking ability, which is necessary for human beings. They take on different roles in each field. And also discuss how can teaching women employees to balance their home and work life and how they balance everything with other roles assigned to them become a challenge. In present days, work and family pressures have unfavorable increased in the group of women. It equally takes energy and time and it increases work-family conflict. These conflicts are shot up by the cultural disagreement on parenthood, in addition to that, the problems faced by teaching women are associated with finding adequate time for child and elderly care. Teachers play a great role in society by shaping the students and recognizing their robustness and fault. The various duties at home and work give rise to stress. Despite all her silence, patience, and tolerance, sometimes her stress creates problems in balancing work and family. The psychosocial puzzle impacts their health and the official and familial field. Teachers experience continuous stress to cope with both conditions, affecting their mental well-being. The purpose of the present study is to highlight the necessity of adopting work-life balance policies for teaching women employees at higher educational levels this paper examines the impact of psychological and demographic factors and technical factors and individual factors on the Work-Life –Balance of teaching women.*

**Keywords:** work life balance, Teaching women employees, Higher Educational institutions. working life vs personal life. Married women.

**1. INTRODUCTION:** To build the nation is not only in the hands as regards men, but it also requires female contribution because in this world 50% of women are there, overall development purpose participation of women is needed, in HR we have considered people are assets of the company their ability, innovation ideas, creativity in their work it increases productivity in the organization. (Angayarkanni,2021). Today Education is the front line of worldwide discussion and decisions to overcome the development of a nation's economy, politics, and society through the education system (Actor,2021), to face the challenging world to create citizens of tomorrow is an unsettling task for the teachers (Bali and Sajnani,2021). The education institution depends upon its central and local government policy, to make the curriculum for teaching Methodology, students, parents, and institutions, these are major tasks of the teachers in their work and life the role of the teacher is more important in shaping the world for a tomorrow (Hasami,2021). Work-life balance is an important issue for every employee in government and private institutions today, this is because there will be a decrease in employee productivity and performance if an organization does not think about the work balance of employees properly and is not



managed properly (Abioro et.al, 2020). Work-life- balance includes a balance between work and personal life that both bring satisfaction to the individual (Batainesh, 2019).

Now a -days the Work-Life –Balance of working women is a major important concept; the time has been changing for earnings for the family. In this modern world, both males and female equally share their responsibility to lead a better life. Hence, it is necessary to know how working employees balance their work and life. Women in India have broken the barriers and built bridges in the professional platform. The W-L-B focuses on two main aspects called career and family, this indicates women should be able to have job satisfaction and at the same time (Kesari jejunal et.al, (2016), would be able to grow up in their career when they work mother can grow up in her career when working women become and happy her personal and professional it shows she had a positive Work-Life -Balance. Work-life balance among working women stimulates innumerable positive impacts on the nation. The central impact is improving the -being of the overall population, organizations, and nation (Thevanes & Mangal Eswaran, 2018). The employees would be more committed, motivated, and productive in their work, which would positively impact their organizations. WLB has a concern with the quality of life and quality of work, balancing a successful career and life is a challenging task for employees in educational institutions (khairuneezam et.al, 2017). The concept of W-L-B includes three words, work, life, and balance. The work consists (of career and ambition), life (health, pleasure, leisure family), and balance is satisfaction and good functioning at work and home with minimum role conflict (Vandana Punia 2013). It means that different people have different W-L-B that depends on their emotional behavior and time demands of paid work, family, and personal duties, it is the situation that the employees are capable of giving the right time to and right efforts to their work and life.

Work-life balance among working women stimulates innumerable positive impacts on the nation. The central impact is improving the -being of the overall population, organizations, and nation, WLB has a concern with the quality of life and quality of work, balancing a successful career and life is a challenging task for employees in educational institutions (khairuneezam et.al, 2017). Work life balance has become one of the biggest challenging tasks for working women these days in every higher educational institution. In this study, there is a vital need to know the balance level of teaching women employees about both their work and family or personal life. If the work life is good, the functioning of the institution will be smooth, and a proper manner work life balance can be managed well. the present study is to highlight the necessity of adopting work-life balance policies for teaching women employees at higher educational levels and maintaining equal balance in personal and professional life. (Abioro et.al, 2020). It is proven that a proper work-life balance is the best aspect that gives results in teaching women employees to get job satisfaction and work in their fields with effectiveness. (Sonia and Aithal, 2019).

**1.1 PROBLEM STATEMENT:** The dynamic in the job, continuous learning, long working hours, lack of consistency in work schedules, pressure and development of both non-technical and technical skills, professional competencies, family and their monetary obligations, and child and parental care have made a strong effect on balancing life and work of teaching women employees who are working in higher educational institutions in north Karnataka. Support from family is very crucial for balancing family and work otherwise it creates conflicts in the family and disintegrates the family and social structure. Previous studies show many aspects such as said that women employees are not confident

in taking decisions about their life and career. They are always dependent on their parent's and husbands' decisions. They expect support from the side of the family and their workplace.

The paper focuses on the stressful life of teaching women in higher education, who are in an alone-ring battle position to keep a balance between personal and professional life. The dream of being independent and carrier orientation became a tough challenge for the working woman she has to perform the duties of a perfect homemaker in the family and a courageous teacher in college. Whether someone lends to helping or not, being a mother is the woman's primary duty to take care of her children. At the same time, she has to manage her parents and in-laws which also care taken is difficult for Indian married women therefore it is necessary to examine the different factors that will affect their work-life balance in personal and work environments and it assists the organization to give better work-life balance for their teaching women employees attain a higher degree of job performance and enhance their satisfaction,

**1.2 REVIEW OF LITERATURE:** The variety of studies addressed work-life balance by teaching women employees from a different context. the pertinent research papers are studied to review the topic.

- 1. Angayarkanni (2021)**, Explained in this study that teaching women employees work-life balance, and their responsibilities is quite different because the teachers not only teach but also they need to spend time for preparation for teaching. The various administrative and managerial duties like a department head, BOE, BOS, Dean, etc. in this study shows major problems during covid -19, what are the problems faced by the professors doing online class, primarily all professors faced technical problems, network issue, teaching conducting online and google meet, and teach mint app, classwork Etc.
- 2. Batainesh (2021)**, Examined in this research the relationship between happiness, the performance of teaching women employees, and their work-life balance. here they identified the result of work-life balance and commitment in an organization and the several factors that influence their work-and-life balance. Those who have a good quality of WLB succeed in their life and work
- 3. Davila et al (2021)** discussed the problems of college teachers and high lights the work-life balance of college teachers and what the facilities expected from their institutions. The teachers are the building blocks of society, the organizations give more importance to the employees because to develop the career of students the contribution of teachers is essential. Apart from that, the teachers faced so many challenges.
- 4. Muthu Lakshmi (2021)**, stated in this study that women employees' work-life balance and their importance in society, and institutions. They identified different challenges faced by teaching women employees and what are the reasons given results in their work-life balance discussed the measures that have been adopted by employees and employers and gave some suggestions for women employees to adopt in their work-life balance by doing yoga listening to music, planning to manage themselves in both sides adopting work-life balance policies.
- 5. Nural Nadra et al (2021)**, Explained in this study to lead a quality life employees should balance their life and career proper manner. They suggested in this study the university and management provide work-life balance policies and provide flexible working hours such as job sharing and working at home. To provide training opportunities

during work time and adequate resources for the staff so they can undertake their jobs properly.

**6. Kesari genal et al (2021)**, discussed in this study the challenges faced by Indian employees in their workplace. And how can the different factors have determined and influenced their work and life? So organizations are required to create a flexible environment that would help employees to manage their work and family together. The role of women is more important, and they are doing multiple roles in work and life, when they became incompatible with one another at that time working women faced difficulty to solve the problem. The problem creates more pressure and imbalance creates overloads of work in their both personal and professional.

**7. Kosanovic et al, (2021)** explained in this research that teaching women employees in higher education are more conflicts in covid 19, doing academic work, managerial duties, etc. in the situation of a pandemic the offline class converted into online classes the teachers are fell more stress not knowing the technical tools it will affect on their both sides.

### **1.3 OBJECTIVE OF THE PROPOSED RESEARCH:**

- To know the work-life balance of teaching women employees in HEI of north Karnataka.
- To understand the various factors influencing the work-life balance of teaching women employees in HEI of north Karnataka.
- To analyze the different factors that impact the work-life balance of teaching women employees in HEI of north Karnataka.
- To suggest various measures adopted to reduce work-life balance issues of teaching women employees in HEI of north Karnataka.

### **1.4 METHODOLOGY OF THE PROPOSED RESEARCH:**

#### **Qualitative research method:**

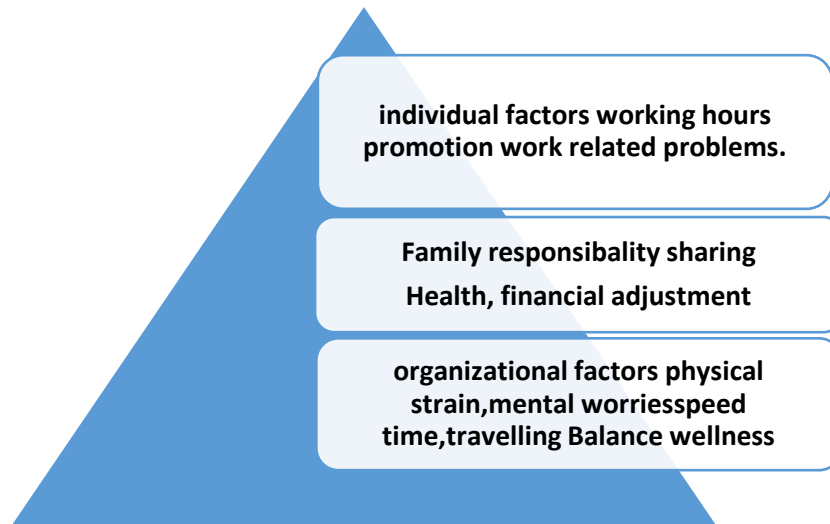
**Primary data:** Data is collected through a structured questionnaire from the teaching women employees in HEI of north Karnataka.

**Secondary data:** In this study, we have dealt with the various aspects of work-life balance through the secondary data review of existing literature, the sources referred to are various journals, books, doctoral thesis working papers, reports, magazines, internal sites, universities websites, etc. In this study, we have adopted a convenient method.

**1.5 Operational Definitions: HEI-** Higher Educational Institutions.

**1.6 The Tools for the Analysis:** Including descriptive analysis, the research study will help women employees on balancing towards work–life. The demographic data was configured considering the variables like age of faculty members, qualifications, number of children, and the family’s annual income. The data includes questionnaire responses from teaching women employees in higher educational institutions.

*Figure -1 Factors affecting work-life balance:*



**Figure 1** states that the various factors impacting their work and life individual factors, organizational factors, social factors traveling problems, technical problems, flexible working hours, workload, psychological factors, mentally stress, etc. the teaching employees felled more stress from the side of doing home chore activities and workplace for their career development. Due to a lack of time consistency, they are unable to do proper work on both sides, and when they feel to balance their work and life, they have faced more challenges.

### **1.7 EXPECTED OUTCOME OF THE PROPOSED RESEARCH:**

Teaching women undergo severe stress as they try to balance their personal and professional life. Continued work under pressure would result in poor performance in the institution as well as in domestic life. Teaching women are striving to improve the life of both their family members as well as their students, in this task if they are neglecting their health and mind, both families, as well as the institution, will suffer.

Some of the techniques that help in striking the balance between work-life balance are as follows time management is one of the best solutions which can help to take reduce the imbalance between the personal and the work life of the employees.

Taking some time out for hobbies and leisure activities, and spending time with loved ones can help to beat the stress and manage a perfect work-life balance.

Institutions are often motivated to implement family-friendly policies centered on the premise that economic gains will be realized from increased employee performance as a result of such policies.

The outcome of the current research is to help the Teaching women employees in HEI to overcome the negative or ill effects of poor work-life balance. So that they can perform more protectively toward the betterment of the organization and society as a whole.

### **1.8 MATERIALS AND METHODS:**

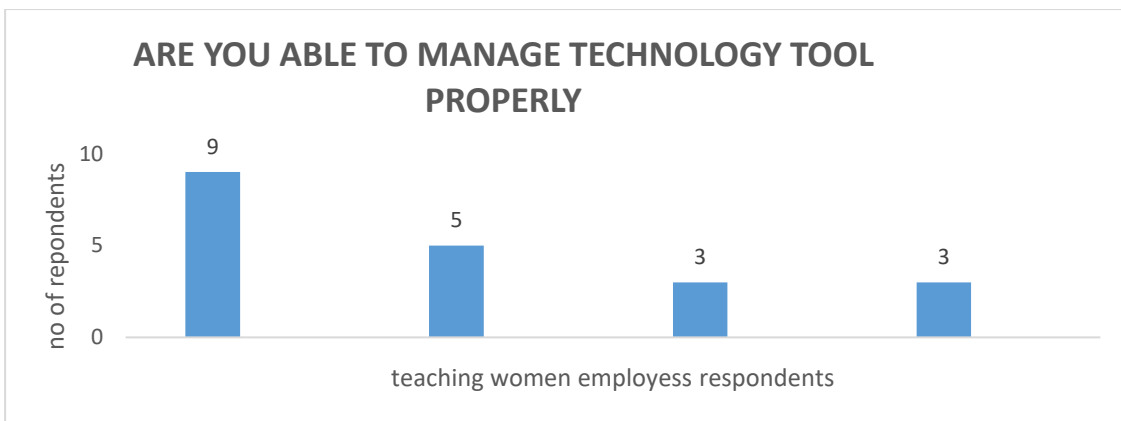
The data required for the study were collected from both primary data and secondary data. The primary data has been collected directly from teaching women employees by using the pre-defined well-structured questionnaire the sampling technique which is used in this study is convenience sampling and the sample size is 550. And Samples were collected from eight universities in north Karnataka viz., Devanagare University, Hampi University, Vijayanagara Sri Krishnadevara University, Rani Channamma University, Karnataka state Akamahadevi women's university, women's university Bijapur. Belgaum

University, and Karnataka University. The statistical tools applied to analyze primary data are percentage analysis, chi-square test, one-way ANOVA, and factor analysis to interpret the data to arrive at findings from the study. For effective analysis and easy understanding. The data were tabulated. The inclusion criteria were women teachers with the designation of professor, Associate professor, and assistant professor, married, single, divorced or widowed, and without children working full time. The secondary data were collected from the published journals, books, magazines, and websites. Ph.D. thesis etc.

**Questionnaire design:** A questionnaire design for data collection that is distributed among participants where they respond to the same set of questions in a fixed structure. Questionnaires are designed according to the factor supported by the questions. The questions are divided into five parts mainly they are consisting of 1) Demographic 2) Work-life balance 3) family satisfaction 4) work satisfaction 5) psychological and mental stress. The preparation questions are very simple and easy to understand.

*Table-1 Are you able to manage technology tools properly:*

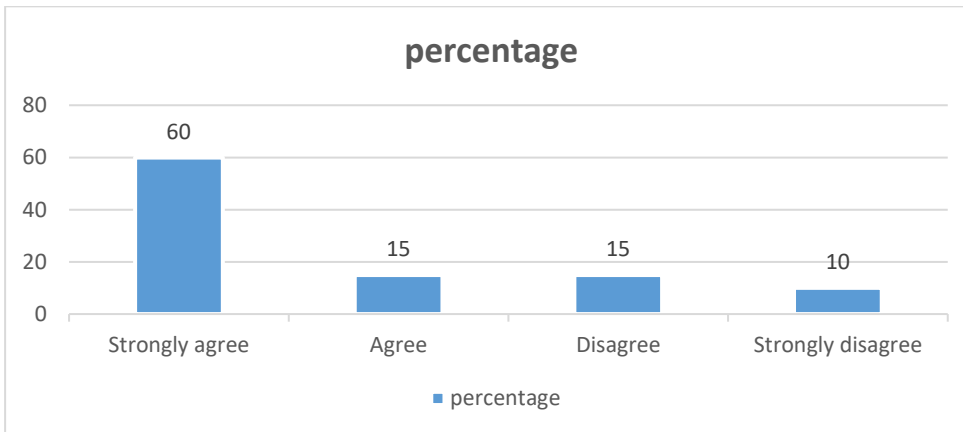
SL.NO	AGE	NO OF RESPONDENTS	YES/NO
1	20-30	9	YES
2	30-40	5	NO
3	40-50	3	NO
4	50-60	3	NO
TOTAL		20	



**Table 1:** indicates that the majority of working women faced a lot of problems when they are conducting online classes because primarily they did not get any idea about technology and computer knowledge. And those who have between the ages of 50-60 feel very difficult to teach on through online and their age factor they are not able to sit properly. They need support from their friends or their Youngers College. They do not feel comfortable teaching through technical tools, and at the age of 20-30 teaching women employees can manage their online classes but they are sharing their experiences they feel so much stress because of network issues and sometimes tools are not supported them. And problems of rural areas students contact etc.

**TABLE 2: DOES THINK THAT IF EMPLOYEES HAVE A GOOD WORK-LIFE BALANCE THEN THEY WILL BE SATISFIED WITH THE JOB?**

Sl.no	Teaching women employees	percentage	opinion
1	12	60	Strongly agree
2	3	15	Agree
3	3	15	Disagree
4	2	10	Strongly disagree
total	20	100	



**Table -2** states that here those who adopted work balance properly have satisfied in their work and life. 50% of the teaching women employees agreed and adopted proper strategy in their work and their life they lead life happily and do work properly. But 15% of the women employees agree and disagree with their work-life balance, and 10% of women employees strongly disagree with work-life balance practice work-life the researcher gets the result that the work-life balance policies and practices are good for teaching women employees. And that will help both the institutions and employees and teach women to expect some flexible policies from the side of government and institutions.

### 1.9 FACTORS OF WORK-LIFE BALANCE OF WORKING WOMEN

The factors that lead to holding to positive or negative about their job have their impact on work-life balance. this mental stress for women can lead to physical stress and cause ill- health, headache, gastritis, body ache, de-motivation, low morale, etc., long-term cardiac problems, high blood pressure, diabetes or other psychiatric problems and low job performance, etc. all these problems generate work-life conflict and imbalance in personal and professional life, especially for women employees, that shows results in:

- Increased Absenteeism
- Increased employees turnover
- Reduced productivity
- Reduced job satisfaction
- Increased managerial stress. And it will Damage their family and social relationships.

A positive and healthy employee-oriented culture translates into an increased interest in work and productivity while work-life balance causes relationship degradation and work

dissatisfaction for women employees because too much work may be because they miss family interactions as well as important events of the family.

*Figure 2: some other impact factors of work-life balance*



1. **Family Factors:** family-related strain interferes with the ability to perform job-related duties, future and spouse parent's demands
2. **Organization factors:** there is a relationship between challenges due to organizational factors the work-life balance is not just the responsibility of the employees but also of the employers. The employers provide policies and programs that will help the employees in maintaining a WLB. Organization factors like family/ friendly policies, relationship with the superior, relationship with colleagues, work schedule, commitments other than teaching, and infrastructure facilities influence work-life balance.
3. **PSYCHOLOGICALICL FACTORS:** women employees face many psychological problems such as mental stress, hypertension, headache, depression, the anger of workload, ml torture, back pain, no proper sleep, less leisure, frustration, irritation, lack of confidence, back pain, doing work in technical tools eyesight problems, the women feel themselves robotic life without rest doing work continuously just finishing task.
4. **CHILD CARE:** the working ladies having little youngsters are compelled to leave their youngster in child care or the hands of a servant, this makes more pressure on them and less think on their work, furthermore not ready to give fitting tend to them on occasion.
5. **DAILY SCHEDULE OF WLB:** the daily timetable is very essential for teaching women employees if their work schedule is good then the family balance is easy.
6. **WORK:** getting ahead at work, completing the task within time, commuting to/from work,
7. **FAMILY:** spending valuable time with family, caring for children and elderly parents, and doing chores at home.
8. **Personal factors:** dispensing time for the family, making health issues, supporting family members, and youngster's development.

**9. Professional factors:** disposition of superiors, less work pressure, long traveling hours workplace, long working hours, recreational facilities, relational relationships, sensible salary, work on holidays.

**10. Motivational factors:** administration to society, backing to family, social recognition, monetary independence, individual satisfaction

**11. Individual Factors** Demographic factors such as gender, age, marital status, and life stage impact WLB. Personality-related factors, work addiction, perfection, and high job involvement also lead to more work hours. Generally, extant Robert spends more time socializing with others and complaining about poor WLB.

**12. Family-related factors:** For those who have aging parents, children, and bigger family sizes do not maintain WLB. The person who has higher family involvement suffers more WLB issues.

**13. Societal factors:** Society also impacts the WLB of the employee. Currently, dual-earning families, nuclear families, and single-parent family, which were never faced by earlier generations. Some countries face a worker shortage problem and increase the retirement age of the employees. In the 8 years, this phenomenon will increase further. The distance between work and home takes more travel time, and employees cannot maintain WLB properly.

**14. Job profile-related:** National policies impact the WLB of the employee; in the same organizations, some jobs are more demanding than others. Therefore, job profiles also influence the WLB, such as workload, work intensity, job requirement, role ambiguity, role expectation, job autonomy, and focus on control. Job roles that require rotating shifts influence WLB negatively.

**15. Organizational Factors:** Organizational culture, Peer group, and senior support determine the level of WLB. Companies that employ diverse workforces are generally seen as more WLB-friendly. The number of working hours and the number of working days per week based on organization policies and requirements also impact WLB. When someone takes pride in his organization, he feels a higher WLB despite the same work pressure level in other organizations.

**16. External Environmental factors:** in today's world role of technology change the way we live before. We are connected with information and communication technology (ICT) devices and are busy on mobile/TV/computer. Global competition forces organizations to operate in a 24X7 working environment. The number of jobs is decreasing as a result of increasing productivity and the usage of artificial intelligence. So, employee bargaining power in the market is reduced and often settled for poorer WLB policies.

**1.10 Results and discussions:** This study is projected to come out with the hope that the problems faced by the teaching women of higher educational institutions must be taken steps during the pandemic situation in covid. Several suggestions are given to the institution of higher education. Employers and government in framing policies, and programs to consider this matter for the education system online, this study is to consider as psychological effect emotional for working women of Indian culture. This study found that most of the women were working with a sense of missing their life, but the educational institutions have not taken any procedure to solve the problems of teaching women employees. In this present situation, educational institutions should address the issues of teaching women employees and their work-life balance. Adopting new policies for their staff according to this covid situation and implementing approaches to help their staff to manage educational work-life balance. The term department should make new policies for higher educational institutions to the establishment of a new performance evaluation



strategy. Taking all these suggestions and recommendations will benefit educational institutions and women employees.

Several suggestions are given to the educational institution. Employers and governments in framing policies, and programs to consider this matter for the education system online, this study is to considered as psychological effect emotional for teaching women of Indian culture. This study found that most of the women were working with a sense of missing life and institutions have not taken any steps to overcome them. In this present situation, educational institutions should address work life balance related issues among staff and adopt new policies according to this covid situation and implement approaches to help their staff to manage educational work-life balance. HRM department should help educational institutions to the establishment of a new performance evaluation strategy. Taking all these suggestions and recommendations will benefit educational institutions and teaching women employees.

**1.11 FINDINGS:** Working women in the educational sector suffer from physical discomfort, psychological problems, and mental tension, women employees are facing occupational challenges such as preparations for teaching at home, standing on the dais, job-related pressure, and lack of break timings. Some other problems regarding their lifestyle such anxiety, depression, mental tension, sleep disturbance, irritability, and family Burdon work and home problems to balancing all those women employees feel a lot of stress, to reducing all these problems better care in the workplace, there is more essential for working women to balance their work and life properly to adopting policies. The educational institutions should address the WLB-related issues among their staff and adopt an enclosed strategy to structure to implement approaches to help their staff to manage their work-life balance which would add to the performance of these staff individuals, employees, and establishment of strong work-family life culture can make educational institutions and representative's benefit from the implementation of WLB programs

#### **1.12 RECOMMENDATIONS:**

1. Make the policies that will help to a women-friendly workplace environment.
2. Conducting training programs for women, such as mentorships, career guidance, and leadership development.
3. Create awareness of the teaching women employee initiatives that highlight the value of women managers.
4. Provide accommodations for women in areas such as need-based postings. That is, as done in civil services, have the policy to post both spouses to the same district or state.
5. Have a true commitment to hiring and promoting women and include women in the annual business strategy.

**1.13 CONCLUSION:** In this study analysis of the work-life balance is an attempt to understand factors affecting the work-life balance of working women and the consequences of poor work-life balance. In the Indian context, women remain primarily responsible for their families, and their career is rarely given top priority. This study has revealed that the burden of excessive work, the need to fulfill others' expectations, and not having time for them are the prime factors affecting the work-life balance of working women. As a consequence, women suffer from job burnout, experience high levels of stress and anxiety, are unable to realize their full potential, and also do not enjoy life. This

study discussed with those who had family support and flexible schedule enjoyed better work-life balance. The above findings have implications for working women in gaining a deeper understanding of factors affecting work-life balance and the consequences of poor work-life balance in the women's eyes. It also provides insights into finding solutions to maintain a healthy work-life balance. From the above discussion conclude that especially in educational institutions the Work-Life Balance is related to important issues among their staff and women employees, and design the policies to support the teaching of women staff to manage their work-life balance which would add to the performance of these staff members.

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# English Literature for Managing Stress Effectively

**K. Kalyanasundaram**

## ***Abstract***

*There is no denying the fact that getting stressed is one of the problems in today's world. People are juggling more responsibilities than ever before and it can be tough to keep up. Thankfully, there are ways to manage stress effectively, and one of them is through literature. English literature, with its rich history and vast canon of works offers a wealth of resources for managing stress. Whether it be the soothing power of poetry or the vicarious thrill of a good novel, literature can help us cope with challenges in life. Literary works can provide an escape from reality, a sense of control, and a way to promote imagination and creativity. Creative works of literature, such as novels and poems, can help manage stress. English literature, in particular, can be a valuable tool for reducing stress levels. They can also offer insights into the human condition that can help us to understand and cope with our problems. Studies have shown that reading novels, poems, and other works of English literature can help reduce stress levels significantly. Medical researchers have proved that reading novels and poetry can be an effective way to combat stress. In one study, participants who read regularly showed reductions in their heart rate and levels of the stress hormone cortisol. Reading can also help to improve sleep quality and reduce anxiety. Besides, English literature has the potential to developing higher order thinking skills.*

## **Keyword**

Stress, Research, Novels, Poems, Bibliotherapy, Sauti poems, Non-fiction, Therapeutic

## **1. Introduction**

Hans Selye (1907–1983) is considered to be the pioneer who introduced the notion of human stress. According to Selye, stress is a nonspecific response of the body to any demand made upon it to adapt, whether that demand produces pleasure or pain. Stress is a "response of the body." To control stress levels, production of mediators such as adrenalin, cortisol and other chemicals is a must. In modern times, stress in workplaces is interpreted as burnout. Kinman and Jones (2005) describe burnout as a result of emotional distress, depersonalization, reduced self-respect and demotivation.

Many options in the form of medications, yoga therapy, counselling and a lot more are available to get relief from stress. Our scope of study here is to discover how English literature can help in reducing stress levels, thereby rescuing human beings from both physical and mental deterioration and the other umpteen health hazards that occur due to stress. Today's life has become fast-paced. The modern generation is much more materialistic than ever before, and people try to overstretch their limits to achieve fabulous results for themselves as well as for their employers (Kinman & Jones, 2005).

Maggie Berg, in her book 'The Slow Professor', refers to David Lodge's campus novel 'Deaf Sentence', in which a graduate student complains that his professor was always busy with meetings and other work and was never available to guide the student. Maggie Berg rightly brings out the external pressures of the changing academic culture (Berg & Seeber, 2017). The Slow Professor admonishes the practice of how thinking has been taking a back seat in our everyday life. Encountering negative results easily destabilizes fragile

minds that are not seasoned to take failures in the work place and in real life. The mechanical lifestyle and non-exposure to rich and positive social acts are the major pitfalls of modern technocrats. This paper does not attempt to exaggerate the use of literature books in order to achieve its goals. Instead, it tries to excavate some of the facts and ongoing practices around the world and present them in a diligent manner.

## **2. Review of Literature**

This article helps to understand how English literature can help overcome stress. Human life is surrounded by grief, sickness, loss, dismay and disappointment. In no way will novels and poems solve these issues directly, but in an indirect way they will address these issues and render a stance and attitude that could be learnt by readers for their future use (Chambers & Gregory, 2006). Reading novels provides immense insight, ethical deliberations and practical applications. Also, some of the clinically proven results published in reputed journals are testament to the fact that reading has a profound effect on reducing stress levels.

People from different walks of life benefit from literature. There is no misconception that only literature students piggyback on novels and poems. Sometimes, engineering and management students turning out to be successful novelists are splendid examples of acquaintances between literature and other professions (Moran, 2008). This paper reveals some fine examples of literature available for stress management. Some medical researchers reveal interesting facts about the literature reducing stress in many people. Irrespective of their age, students and others benefit from English literature (Watson, 2015).

## **3. Results and Discussion**

Certain practices making use of English literature are in vogue to relieve stress. Among them, Bibliotherapy is a prominent one that has been in use since the early 20<sup>th</sup> century. Stress reduction happens through different genres of novels. There are numerous novels written by renowned authors from various centuries that are available for reading to relieve stress. Reading poetry and verse is also a widely accepted way of reducing stress for many. Sauti poems released by the United Nations play a vital role in affecting tranquility, thereby reducing stress. Reading non-fiction is also a perfect antidote to stress, besides influencing the knowledge and intellect of the stressed.

### **3.1. Bibliotherapy as an Early Practice**

Bibliotherapy is one of the prominent methods which has been in practice as a cure for emotional problems in adults and even in children (Jackson, 2006). Bibliotherapy has gradually reached the limelight since the beginning of the second half of the 19<sup>th</sup> century. French psychiatrist, Pierre Janet, believed in prescribing reading for the betterment of life. Bibliotherapy was wildly used during and after the world wars to deal with military personnel and civilians, especially in rehabilitation hospitals (Jackson, 2006). Today, bibliotherapy has come a long way to deal with stress-related problems effectively.

Bibliotherapy has extended its wings through research and reached out to a major population in the form of simple reading of chosen literature works. This promises a lot of benefits, both mentally and physically. It's been shown to reduce stress, improve cognition, and even help with insomnia. Studies have found that reading can help increase empathy, creativity, and attention span. Reading is an excellent escape from everyday life and a great way to learn about new places, people and experiences. Reading is also a great exercise for our imagination, creativity and curiosity. This can make employees work

more efficiently and productively than ever before. It's been shown to reduce stress, lower heart rates and blood pressure, help you sleep better and improve your cognition. Reading has also been linked with positive emotional and psychological effects (Jack & Ronan, 2008). It has been shown to reduce loneliness and improve social connections, increase patience and relieve depression.

### 3.2. Reading Novels to Relieve Stress

Reading fiction is found to be a wonderful antidote to stress. It has a psychic connection that brings forth mental wellbeing (Michael, 2013). The reading that is spoken of in this context largely refers to literary texts of varied genres. The study of English literature aims to develop the reader's appreciation for reading as a pleasurable activity and an introduction to the world of great writers. Some stress management courses teach you how learning can help you reduce stress and care for your mind, body, and soul. Reading helps people escape from the daily routine and enter another world that is different from their normal one. Reading also helps one understand people better by empathizing with fictional characters (Michael, 2013). Besides, reading brings new ideas, thoughts and philosophies into our lives, which can be beneficial for an individual's growth.

#### Humanities Promote Health

Not everyone stressed out prefers to hang around with books for hours together and lose themselves in the unreal world of fantasy. People can't just take to reading overnight unless they are habituated to reading. It all depends on the kind of interest and involvement one possesses in reading novels or poems. In today's hectic world, creative novels can help people manage their stress. Arts and humanities have a profound connectivity to health (Staricoff, 2004). Medical research has proven that novels are an antidote to stress. Some famous novels and poems are prescribed for this purpose. A wide range of books are available for reading that can help reduce stress. By prescribing these books for reading, patients get better. Students improve their learning skills. It helps everyone do well by reducing stress. Reading literary works can be therapeutic as it helps the reader to manage and cope with stress by providing an escape from the real world into a make-believe one where they can control the outcome of events (Michael, 2013). This form of escapism allows readers to explore different scenarios and situations while also providing them with a sense of control, which can be beneficial in managing stress. In addition, literary works can also help to promote imagination and creativity, both of which are useful in coping with stress.

It is important to understand that readers are more empathetic than non-readers. People who read have been proven to be better at understanding what someone else is thinking or feeling because they have taken on those perspectives as if they were their own. And reading has also been linked with increased vocabulary skills. The readers of literary books understand and appreciate the movements and perspectives of the narrators. Exposure to human nature can enshrine one's choices of living. The readers gain knowledge about the world from different characters (Baaqeel, 2020). Besides, the reader's personality estimation while reading literature books is an important skill acquired through the reading of literature books (Baaqeel, 2020). The reading of literature further leads to creativity and an educated approach to society. Baaqeel also analyses how literature books infringe on the motivation, attitude, anxiety and confidence of readers to shape these attitudes.

### 3.3. Stress Management by Reading Poetry and Verse

Poetry and verse are brief forms of writing that have a big impact on the reader. When someone reads a verse or a poem, he or she will be able to relate to what the author is saying and understand the meaning behind their words. This can help reduce one's own

stress and find meaning in life (Shapiro, Duke, Boker, & Ahearn, 2005). Poetry and verse are accessible to people of all ages. One need not be an expert or have a background in literature to read and understand poetry. This makes it easier for people of all ages to read poetry and find comfort in its words. This is important because reading poetry has been shown to reduce stress and make people more empathetic towards others.

'Sauti Poems of Healing' is a book released by the United Nations in the year 2021 which comprises about 167 poems. The idea behind releasing this book of poems is to promote mental health and well-being in humans. All the poems are very simple to read. I am the Forest, Her World Within, and Journey of Life are some of the examples that very clearly show that any ordinary man can access the book for better healing (UN, 2021). The illustrations in the book are simple and creative. Martha Helena Lopez, Assistant Secretary-General for Human Resources Department of Management, rightly emphasizes the importance of nurturing mental health and wellbeing in her foreword message.

According to Jabarouti, poetry can be therapeutic. The rhythm of poetry affects the emotional part of the brain, thereby regulating the stress hormone. Jabarouti et al. (2014) studied the impact of classical Persian poetry on 26 men over a period of a few weeks. It worked wonders by reducing their stress levels. He also suggests that classical poetry in any language by the speakers of that language will help reduce stress.

### 3.4. Non-Fiction and Stress Management

Reading non-fiction helps to learn more about a specific topic. This will help to expand the knowledge base and make one feel more knowledgeable about the world around them. When you read a non-fiction book, you are able to put yourself in the author's shoes. You can imagine yourself writing the book and researching the topic thoroughly so that you can provide accurate information to your readers. In this way, you are able to better understand how the author came to the conclusions they did and how they were able to find sources to support their claims. A variety of subjects surrounding human life, such as ethnicity, socioeconomics, therapeutic culture, etc., can influence readers by channeling their intellect and ability to think (Knudson, 2013). Reading books of this kind contributes to boundary creation and maintenance.

#### Reading and the Theory of Mind

When we read fiction, we can identify with the characters in the story and put ourselves in their shoes. For example, if the story is about a person who is going through a divorce, you can imagine yourself in the same situation. In this way, you can better understand what that person is experiencing and feel their pain. As a result, you reduce your own stress and are able to cope better with whatever situation you may be in. Fiction novels are also great for exploring different perspectives and ideas. For example, reading about North Korea through a novel can help you understand what the country is like without having actually been there. You can get a better sense of the culture, the people and the issues that they face. Novels have the ability to make you think about life in a different way and give you a new perspective on your own life. According to Liza Zunshine (2006), people read novels for reasons that they engage their theory of mind and it even goes beyond that. Reading novels helps in forming the emotions and perceptions of the readers. It also provides readers with a good understanding and an ethical sense (Zunshine, 2006). Above all, they enrich readers with new forms of knowledge that could help in their day-to-day lives. The narrative techniques could cater to the reasons that we have been looking for at levels of managing stress.

Liza Zunshine (2006) refers to a few novels such as *Clarissa*, an eighteenth century epistolary novel, *Emma*, a comedy of manners by Jane Austen; *Mrs. Dalloway*, a stream

of consciousness novel by Virginia Woolf, *Lolita* by Vladimir Nabokov, with an unreliable narrator. All of these novels possess meta-representation ability and engage readers in a focused way (Zunshine, 2006). Novels by Virginia Woolf and Raymond Chandler have a very different appeal to many readers. Analysis by Liza Zunshine of fictitious works across different time periods and their impact on readers is a very good lesson to learn and adapt the right kind of fiction for effective stress management programmes.

It is not easy to guide a stressed-out employee towards reading all of a sudden if he or she is not used to reading habits. It requires a gradual step in and once reading is systematic, the reader will reap all the benefits. Employers can think of setting up a small reading kiosk with an expert who could gently guide employees into the world of reading with his experience. Alternatively, business establishments can also employ someone from the department of humanities to be entrusted with counselling, personality development skills and a lot more social-related activities to break the monotony of the workplace and revive the workforce with innovative thinking. A Harvard Review article hints at guided literature training at workplaces since it helps in building empathy, critical thinking and creativity (Seifert, 2020).

Different types of literature have different effects on the brain, but all of them can help to manage stress in some way or another. Novels, for example, can take us away from our everyday lives and transport us into new worlds, giving us a much-needed break from reality. Poetry can also be therapeutic, giving us a chance to express our emotions in a creative and safe way.

#### Available Reading Choices

Some of the most famous novels and poems have been prescribed for stress management. These include works such as *To Kill a Mockingbird*, *The Catcher in the Rye*, and *The Great Gatsby*. All of these books have been shown to help reduce stress levels in those who read them. There is a wide variety of literature books to choose from, so readers are sure to find something that they enjoy. Whether it's a classic novel or a contemporary poem, simply immersing oneself in the words can be incredibly calming. There are many different genres of English literature and so there is something to suit everyone's taste. Whether you prefer poetry, novels, or plays, reading can help you relax and de-stress.

Some specific works of English literature that have been found to be helpful in managing stress include Shakespeare's plays, the poetry of Tennyson, and the novels of Jane Austen. Sometimes, overwhelming stress due to personal life is not easy to manage and it can cause distress in the workplace too. Liza Zunshine (Zunshine, 2006) explores how this can be dealt with effectively through writing poems for self-healing. Dialogical self theory and the evolution of metaphors in her narratives are something to watch out for in her narratives that do the job effectively.

#### Benefits of Reading and Success Stories

According to Harvard Business Studies, reading fiction helps readers discern other people's motivations. Reading fiction helps to keep an open mind while processing information, thereby making one's mind take decisions that are effective. According to research, people who find it difficult to make quick decisions after getting new information lack cognitive closure. This cognitive closure is strengthened as one learns to read fictional works that train the mind to look for early information cues. Research also reveals that people who read short stories demonstrate a lower need for cognitive closure. Maryanne Wolf, a popular cognitive scientist and author of "Reader, Come Home," suggests that the quality of one's thoughts stems from the quality of reading. According



to her, better readers alone can make better thinkers (Seifert, 2020). Successful businessmen of the world, such as Warren Buffet, Mark Cuban, Elon Musk and many others, have been successful in their industries by virtue of voracious reading and this has been stated and openly accepted by them (Seifert, 2020).

#### 4. Conclusion

English literature is a rich source of knowledge and can help you cope with the pressures of daily life. Reading fiction allows you to put yourself in another person's shoes and empathise with their feelings and situation. Reading non-fiction allows you to learn more about a specific topic and expand your knowledge base. Poetry and verse help you better understand and appreciate life through the written word. Literature is a multifaceted entity that transcends to act as a stimulant in the overall curriculum, enabling students to actively pursue other studentship skills in addition to moulding their character and personality. Literature has something for everyone who aspires to become a scientist, a philosopher, a moralist, a political leader, a philanthropist, etc. Ultimately, a person who is stressed out will come back strongly after practicing reading and will be more knowledgeable than a person who has never tried reading. Managing stress is only a part of reading practice. Acquiring other benefits, such as improving higher-order thinking skills, is very much on the cards.

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## Welfare of platform workers through a global lens

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### **Abstract:**

*Digital and platform labour increased rapidly and these changes in labour market are yet to be reflected in the existing regulatory systems in most countries. This paper explores the laws aimed at labour welfare specifically with respect to their applicability to the gig and platform workers. Studies show that while the gig and platform labour market is increasing, there are several gaps in the statutory requirements with reference to the classification of the workforce, and coverage under existing labour and welfare laws. While most countries acknowledge the need for changes and for new legislations, the challenges include complexities for the gig and platform workers, the employers who engage them and the respective nations who are grappling with this new dynamic.*

**Keywords:** Platform workers, welfare laws, precarious work, monopsony

The Indian Federation of App-based Transport Workers (IFAT) filed a Public Interest Litigation in the Supreme Court of India in September 2021 drawing attention to the welfare of platform workers and their statutory benefits or lack thereof. Welfare regulation has historically emerged from the felt need arising out of work relationships. 20<sup>th</sup> century technological advances have given us the fast-growing platform economy. Companies operating in this space, ‘generally use cloudbased technologies to mediate or match workers with consumers’ (Vallas 2019). Section 2(55) of the Code on Social Security, 2020 in India defines platform work as ‘a form of employment in which organisations or individuals use an online platform to access other organisations or individuals to solve specific problems or to provide specific services in exchange for payment’. The Code [Section 2(35)] defines a gig worker as ‘a person who performs work or participates in a work arrangement and earns from such activities outside of traditional employer-employee relationships.’

The 2017 European Commission Report analysed the gamut of work offerings on platforms distinguishing them into crowd-working and the gig economy (Fig 1), based on spatial dispersion and further sought to differentiate work based on the skill, complexity and expertise involved, with the lower-end involving micro-tasking jobs, taxi services, food and other delivery services, cleaning and such, and the higher-end consisting of freelancers from different fields – programmers, designers, artists, as well as gig based work such as care work, repair services, artists and other performers etc. Gig work is seen as technology-based but with a necessary element of face-to-face interaction between workers and consumers. In this paper, the term platform work is assumed to encapsulate gig and platform work as well.

Business operators in the platform economy project themselves as providers of new forms of employment that optimise opportunities for workers and benefit the end user or

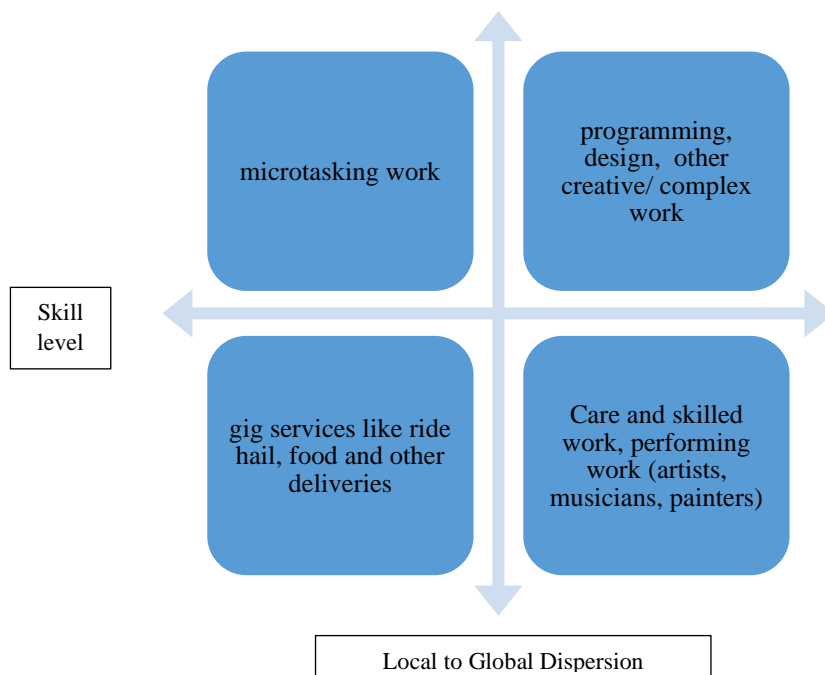
consumer. Extant literature shows a range of views on whether platform work is something new or a subtype of existing forms of labour.

### Workers, Precarious work, Flexicurity and ‘Putting out’

The traditional categorisation of labour include self-employed persons, employees, contractors, contract labour, and other forms of unorganised labour. The entire edifice of labour welfare has been built on these known forms of labour. Hybrid work arrangements have occupied spaces between the defined silos of self-employment and other standard forms of employment with variations along the temporal dimension and also the bipartite/triangular relationships between various parties. They allow platform businesses to treat workers as self-employed.

Literature on different forms of work has sought to document the variations as enunciated in precarity, flexicurity and such. The International Labour Organization (ILO) has developed standards for atypical and precarious employment, including the 1994 Convention Concerning Part-time Work, 1996 Convention Concerning Home Work, and 1999 "Decent Work" initiative. The Council of the European Union (2007) came up with common principles on flexicurity wherein it spelt out that “*Flexicurity involves the deliberate combination of flexible and reliable contractual arrangements, comprehensive lifelong learning strategies, effective active labour market policies, and modern, adequate and sustainable social protection systems.*” European Commission formulated the Temporary Agency Work Directive (2008) recognizing the tripartite nature of work relationships involving a worker, agency and a consumer or user, and seeking to protect the worker in this relationship. The pervasive belief regarding temporary agency work was that it “*meets not only undertakings’ needs for flexibility but also the need of employees to reconcile their working and private lives. It contributes to job creation and to participation and integration in the labour market.*”

Fig 1: Types of Work in a Platform Economy



Regulation and policymaking is based on the premise that these work arrangements are beneficial to all the parties involved. Internet-based economy has led forms of work with platform as the pivot. Question then is whether it is indeed beneficial to all, particularly to the workers.

The current framework of labour welfare involves employers, employees and associations like trade unions which have arisen out of a need for organised representation of the interests of workforce. Flanagan (2019) sighted parallels between the platform economy and domestic servants & home-based careworkers of 19<sup>th</sup> and 20<sup>th</sup> centuries, who were not protected by existing labour laws due to the very nature of their work, and argued that platform and gig work, with short termism and fungibility of workers, leads to a shift towards structural domination and creates work situations which are not different from them. Gig economy then is not viewed as being different from other forms of precarious work (Montgomery and Baglioni, 2022).

Kenney & Zysman (2016) and Mika (2020) draw attention to the fact that platform work was but an evolved form of the erstwhile ‘putting out’ system. Putting out system saw widespread prevalence from the 15-16th century onwards in Europe. Post-industrialization, it was largely replaced by employer-employee relationships which came under the purview of welfare laws but it continued to be retained in parts of the world and in specific industries like watchmaking in Switzerland, and toymaking in Germany (Encyclopedia Britannica).

Most of the labour welfare measures across the world are mandatorily extended to employees in an “employer –employee” relationship. Any work arrangement that falls beyond the purview is either left unaddressed or needs specific legislation. While the pitch is that platform businesses are benefiting consumers, where its workers are concerned, the entire platform economy is riding on the lacunae created by classification.

#### Classification of Platform Worker

Platform companies insist that they are not employers but providers of a space where the requirements of a consumer are matched with specific work offerings of the party upstream. So essentially contractual agreements are between independent parties and there is no employer-employee relationship, making the workers independent contractors or self-employed persons. Workers in the platform economy would thus be beyond the scope of labour and concomitant welfare measures but may fall under the purview of Anti-Trust Laws or the Competition laws which regulate conduct of businesses. If this line of reason is adhered to, then work providers should truly experience flexibility, autonomy and independence with respect to the clientele, pace and type of work undertaken. But the algorithm in technology driven platforms is making the intermediary increasingly dominant resulting in vertical restraints (Caffarra and Kuhn, 2018), which begs the question as to whether they are truly independent or self-employed.

US Bureau of Labor Statistics classifies ‘Self-employed’ as those who work for profit or fees in their own business, profession, trade, or farm. There is no single, clear legal definition of the terms ‘employed’ or ‘self-employed’ in EU law. Employment status is determined by the written or oral contract. Interpretation takes into account not just the letter but the spirit of law. Hence courts may rule that despite the terms mentioned in the contract, a person may be identified as an employee.

The 2021 Uber judgment in UK made drivers their employees. Globally platform workers are treated differently in different countries (Fig 2).

Fig 2: Existing Legislation Related To Gig and Platform Work across Countries

Sno	Country	Classification	Legal Status
1	Austria	Employee or independent contractor depending on criteria: Behavioral control; Disciplinary authority; The personal dependency; The operating resources.	Most employee protection regulations are not applicable to independent workers No plans for or drafts of a law on platform work. No applicable Collective Bargaining Agreement.
2	Australia	Independent contractor	Fair Work Commission's powers to be extended "beyond employment" to include roles in relation to contracted workers set minimum wages and minimum standards and conditions for contracted workers; set minimum wages and minimum standards and conditions for contracted workers; rule/decide on classification
3	Belgium	Not specific. Only two statuses (- employee vs self-employed) under law depending on contractual qualifications in the contracts.	Belgian courts have not given a definitive ruling on the issue
4	Canada	Independent contractors; unincorporated self-employed	Ontario government proposal - minimum wages, regular paydays and employment standards for gig workers
5	Chile	freelancers	Labour legislation does not apply, companies do not withhold taxes or social security payments. Contracts can be terminated any time, without cause and without severance payments.  Chilean Congress is considering several bills that classify platform "drivers" as regular employees. (several Labour Courts in Chile have already declared

			the existence of an employment relationship)
6	Colombia	Not employees Three main criteria: compliance with agreed-upon working hours; tools for operations given by employer; same or a similar salary per month	New legislation, Law 1174 (2020), introduced that anticipates social security system contributions for platform workers according to hours worked- flexible system whereby contributions can be paid by the day or by the hour.
7	Croatia	Mostly classified as independent contractors. Decided on a case-by-case basis. Employment relationship if service contract contains provisions like unlimited timeframe for completing work, remuneration on basis of time worked (not on the work performed), working hours defined and vacation periods paid for; Company exercises authority over work, and company provides equipment and resources.	Law not specific about “nature and type of work typical for employment”. A few initiatives launched recently to define criteria specifically.
8	France	Employment relationship is based on the existence of a "subordination link".	Supreme Court and other court decisions declaring platform workers as employees. Dec 2020 Report suggesting use of a third-party intermediary for platform workers, which would be their employer. If this triangular relationship is implemented, platform workers could benefit from an employee status with no direct link of subordination to platform.
9	Germany	Depends on concept of "personal dependence"-	German Federal Employment Court December 2020 judgment increased

		<p>company's control of the collaboration such that the worker is not free to determine place, time and content of activities</p>	<p>chances of platform workers being classified as employees.</p> <p>Federal Ministry of Labour and Social Affairs paper "Fair Work in the Platform Economy", which provides for specific measures to improve legal position of platform workers.</p> <p>Federal Ministry of Labour and Social Affairs is targeting platforms, with an intention to make it easier for platform workers to assert employee status in court by shifting burden of proof. Workers who qualify as independent self-employed to be given access to employment and social protection "mechanisms" -</p> <ol style="list-style-type: none"> <li>1. minimum notice periods and protective regulations under employment law, such as continued payment of wages during illness, regulations on maternity protection and leave;</li> <li>2. statutory pension insurance and financial participation of platforms in the costs of retirement pensions;</li> <li>3. Giving workers opportunity to organise under collective law and jointly negotiate the fundamental terms and conditions of the work.</li> </ol>
10	Italy	Employee or 'para-subordinate'	<ul style="list-style-type: none"> <li>• activity carried out in a "predominantly" personal and continuous manner;</li> <li>• 'organised' by company;</li> <li>• no constraints on duration of work or where it is carried out.</li> </ul>
11	Ireland	No clear definition	<p>Code of Practice was first prepared in 2001, intended to be a living document that can be amended frequently and aims to be of benefit to employers, employees, independent contractors and legal, financial and HR professionals; also aimed at investigators, decision-makers and adjudicators in Department of Social Protection, Office of the Revenue Commissioners, the WRC, their appeals bodies, and the courts.</p>
12	Kenya	Self-employed.	Changes not anticipated.



		Other categories are casual, fixed-term, permanent and pensionable and probationary contracts	
13	Poland	Independent contractor but scope for interpretation.	Polish Labour Code provisions says employee qualification is "subordination to the employer"  Polish law does not recognise "worker concept". In case of a dispute, labour court would analyse how in reality the work was done.
14	Slovenia	Unclear; case-by-case basis	"elements of the employment relationship" as defined in Employment Relationship Act – <ul style="list-style-type: none"> <li>• worker integrated voluntarily into employer's working process and working process is organised;</li> <li>• obtains remuneration;</li> <li>• continuously carries out this work in person;</li> <li>• carries out duties according to instructions of employer and is subject to the supervision of employer.</li> </ul>
15	Spain	case-by-case basis	Several High Court decisions and 2020 Glovo decision by Supreme Court ruling as employees
16	Switzerland	Classification based on factual circumstances rather than on wording of a written contract	Vaud Cantonal Court – Uber drivers as employees.  No major changes anticipated
17	Turkey	depends on whether this individual is taking instructions from an employer for fulfilment of his work	Employee – Turkish labour law  Freelancer - Turkish Code of Obligations
18	Ukraine	Not employees	proposals to recognise any work as being performed under an employment agreement, irrespective of the type of contract, if <ul style="list-style-type: none"> <li>• individual performs work according to a specific qualification or profession</li> </ul>

			<p>under the control of a person for whose interests work is performed;</p> <ul style="list-style-type: none"> <li>•company provides the production means (e.g. vehicles, fuel);</li> <li>•systematic payment to the individual;</li> <li>•company regulates the individual's working hours and vacation time.</li> </ul>
19	USA	Independent contractors	<p>IRS, NRLB, FLSA</p> <p>NLRB (agency which oversees union activity and workers' rights) assessing whether to reconsider its standard for determining the independent contractor status</p>

### Indian context

The Social Security Code, Chapter 2, defines "self-employed worker" as any person who is not employed by an employer, but engages himself in any occupation in the unorganised sector subject to a monthly earning of an amount as may be notified by the Central Government or the State Government, as the case may be, from time to time or holds cultivable land subject to such ceiling as may be notified by the State Government and "social security" means the measures of protection afforded to employees, unorganised workers, gig workers and platform workers to ensure access to health care and to provide income security, particularly in cases of old age, unemployment, sickness, invalidity, work injury, maternity or loss of a breadwinner by means of rights conferred on them and schemes framed, under the Code.

The Code explicitly addresses the welfare concerns of platform and gig workers. By definition, as things stand, most of the platform workers would be classified in the unorganized sector. "Unorganised sector" means an enterprise owned by individuals or self-employed workers and engaged in the production or sale of goods or providing service of any kind whatsoever, and where the enterprise employs workers, the number of such workers is less than ten; and "unorganised worker" means a home-based worker, self-employed worker or a wage worker in the unorganised sector and includes a worker in the organised sector who is not covered by the Industrial Disputes Act, 1947 or Chapters III to VII of the Code.

As per the 2021-22 Economic Survey 9.55 crore workers in India worked in the organised sector whereas 43.99 crore were workers in unorganised sector. The Unorganised Workers' Social Security Act (2008) was passed to provide for (a) life and disability cover; (b) health and maternity benefits; (c) old-age protection; (d) educational schemes for children; (e) skill upgradation of workers; and other benefits. This is now subsumed under the Social Security Code. Gig and platform workers must be compulsorily registered on an online portal to qualify for benefits and also fulfil conditions such as

- Aged between 16 and 60 years
- Worked for not less than ninety days during the preceding twelve years
- Submitted a self-declaration electronically or otherwise in such form and manner containing such information as may be prescribed by Central Government
- Apply for registration in such form along with such documents including Aadhaar number

*Fig 3: Social Security Schemes for Unorganised Workers Currently In Force*

S No	Name of the Scheme
1	Janshree Bima Yojana
2	Aam Admi Bima Yojana
3	Rashtriya Swasthya Bima Yojana
4	National Family Benefit Scheme
5	Indira Gandhi National Old Age Pension Scheme
6	Janani Suraksha Yojana
7	Handloom Weavers' Comprehensive Welfare Scheme
8	National Scheme for Welfare of Fishermen and Training and Extension
9	Handicraft Artisans' Comprehensive Welfare Scheme
10	Pension to Master craft persons

While the intent is laudable, the welfare measures (Fig 3) are inadequate and do not cover many unorganised and platform workers. Welfare measures purely based on government schemes have a long way to go in fulfilling the requirements. The other parties in the triangle - the downstream users and the platform businesses are not yet made part of the narrative. This distances the immediate players from direct responsibility.

#### Platform work and monopsony

Employment arrangements with contractors give businesses structural advantage, remove the liability of statutory benefits and protections, compress payments, yet dictate terms regarding work (OECD Report, Steinbaum, 2020) while for the workers it is less bargaining power, low wages due to competition and no collective action. Labor market monopsony is created when firms wield power over their suppliers, like suppliers of labor, i.e., workers (Dube, Manning & Naidu, 2018; Steinbaum, 2019) Non-compete clauses, powerful algorithm driven carrot-and-stick incentives coerce workers making self-employment an antiphrasis.

#### The road ahead

Welfare measures targeting platform workers will evolve based on whether they will be classified as employees or as independent workers. Current legal systems are built on suppositions that can no longer be taken as the foundation in technology-driven economies. The paradigm shift calls for a rebuilding of the edifice rather than looking to tweaking or making changes within the existing archetypes.

If platform workers are viewed as employees, the definition of employee, employer and criteria for evaluating employer-employee relationship need to be redefined under law. It will create complexities for workers who currently enjoy the flexibility built into the role of independent contractor if the criteria are applied as is. Other changes targeting welfare could be creating a system making platforms liable for social security contributions based on the volume and number of workers contracted through them or exploring options like in France with third party intermediaries which would then beg the question as to whether it is really helping or complicating the issues.

Anti-Trust laws like the Competition law in India and in other countries primarily focus on preventing monopolies, and protecting consumers from predatory business practices with an underlying presumption of two parties- the businesses and the consumers. Platform economy is all about triangular relationships. If workers are firmly categorised as self-employed then anti-trust laws have to evolve to protect these vast number of small players upstream from being marginalised and discriminated against.

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## " Impact of gender on awareness and adherence of IPC among nurses of select super speciality hospitals"

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### **ABSTRACT**

**Background:** Infection can be defined as the invasion and multiplication of germs inside the body. The Central Sterilization Supply Department's (CSSD) main function is to clean, disinfect and provide sterile items for subsequent use by healthcare professionals in various departments in the hospital. Few studies are conducted in accessing the staff awareness, practice, and adherence to infection control in CSSD in India and globally to look into real challenges faced by this integrated unit.

**Aim & Objective:** The study aims to explore and analyze the strict adherence to infection prevention control measures at Central Sterile Supply Department.

**Methods and Materials:** The study was conducted in CSSD at a super-specialty hospital. A random sample of nursing staff (22) in CSSD was taken. Structured questionnaires on staff awareness, practice, and physical facilities that affect infection control practices were circulated by interview method and observational checklist. The data was decoded and analyzed with the descriptive statistical tool by software in SPSSv26

**Findings:** Apprised knowledge about the latest methods and infection control mechanisms will reduce the risk of cross-infection and consequently improve patient safety and nursing staff's safety.

**Keywords:** CSSD, Sterilization, Nosocomial infection, Health care, HIV/AIDS, COVID19

### **1. Introduction**

Infection can be defined as the invasion and multiplication of germs inside the body. Germs may be bacteria, virus, yeast, fungi, or other microorganisms which causes fever or any other health problems. The infection can occur anywhere, may it be from the

outside world or from hospital visits or inpatients. It can spread to patients or even to the staff. So, control of the spread of infection is the biggest challenge within a hospital.

Nosocomial infection or hospital-acquired infection (HAI) is an infection developed from a hospital environment such as one acquired by a patient during a hospital visit and may even affect the hospital staff. Nosocomial infection is the most common adverse event in healthcare, impacting morbidity, mortality, and quality of life. Almost 7% in developed countries and 10% in developing countries will acquire at least one HAI.

However, a large percentage of HAI are preventable through effective infection prevention and control measures. Standard precautions and Transmission based precautions are two tried approaches to interrupt the mode of transmission of infectious agents.

Standard precautions refer to work practices that are applied to all patients receiving care in the hospital regardless of their diagnosis or presumed infectious status so as to minimize the risk of transmission of infectious agents in all situations.

Transmission-based precautions are required to be taken on the route of transmission of organisms like contact precautions, airborne precautions, etc.

One such department where control of infection is taken at the utmost priority is Central Sterile Supply Department (CSSD). The contaminated reusable medical devices are received, processed, recorded, and dispatched at CSSD. It is an integrated unit with a common goal to prevent infections which entail high costs to society, not only economic but also social means.

Many challenges are faced in CSSD to prevent infection sometimes like barriers of lack of knowledge, ignorance, barriers of financial in nature where no adequate staff, inadequate space, too few instruments for rotation, unreliable equipment, or some other factors. The CSSD staff nurses shall perform their job in sequent, starting with cleaning, disinfecting, packing, and sterilizing. The maintenance of proper inventory is also a critical part of their duty. There should be a tendency within them in preserving the value of the surgical and reprocessed items without causing them any damage. Records of all the process tests and sterilization cycles as per their date, time, and load details along with dispatch records are maintained. Proper hygiene should be the priority of the CSSD department. From the first step of receiving the contaminated items to the last step of the dispatch. In addition, there is a responsibility to ensure functional and performance checks of reusable medical devices. The storage facility, civil works, fire safety, material handling safety procedures, and special tools used shall be free of contamination at any stage to provide guaranteed sterile items at dispatch. CSSD supervisors must keep diligent records that serve as a guide for medical staff about sterile dispatch materials currently deploying to which department and in what context. The CSSD layout design is unidirectional. It is marked with different zones as per their contamination level. The red zone is highly contaminated and the packing area is the Blue zone and sterile storage is the Green zone. The CSSD is divided into three major areas or zones namely: 1) Decontamination or the Red zone area, 2) Assembly and Processing area or Blue zone 3) Sterile Storage, Distribution or Green zone area.

The decontamination process reduces the microbial contamination of materials from surfaces of medical devices and materials. This is achieved by physical or chemical methods.

Assembly and processing are the next steps involved. The medical instruments and devices are reassembled; a control and packing table with a magnifying glass and inspection tools are set up to ensure that only good and serviceable items are sent further for packing and sterilization.

The next step is the sterilization process by which all microorganisms, viruses, bacteria, and spores are completely eliminated. The heat-sensitive load will undergo low-temperature sterilization and others shall be processed in a steam autoclave at high temperature and pressure. Once the sterilization process is completed, the materials are unloaded from the sterilizer and stored in sterile storage which is completely isolated from the clean zone. The goods are stored till they are dispatched on demand by the user department. The sterile storage meets certain criteria of controlled environmental conditions like humidity, temperature, and positive air pressure with ultraviolet lighting protection to avoid any contamination during the storage period. The sterile goods are distributed to the user department with the details of the process undergone which are read by the batch monitoring strips used while the sterilization process indicates- the lot number, autoclave unit details, date and time, and sterile indicators. The goods are dispatched in a closed transport trolley to avoid any contamination while in movement till it reaches the end-user. The unidirectional workflow pattern is followed in CSSD where there is a sequential flow in the process from decontamination, packing, and processing, sterilization, sterile storage, and dispatch in a unidirectional pattern. This is a major role within the department to ensure that there is no chance to develop any case of cross-infection. This may be checked and identified from the level of staff entry to the dispatch section and even the CSSD equipment should remain free of contamination.

The review shows there are limited studies conducted in understanding the spread of nosocomial diseases. There is a need for finding out the various causes of hospital-acquired infection (HAI). It is still a mystery where the patients or even the healthcare workers are getting infected. The root causes of these infections are very rarely found and get dissolved in due course of time unless it becomes an outbreak and affects the community. Today the whole world is suffering from COVID19 which is a pandemic, mystery unsolved. There is an urgent need for accessing the awareness and practice of healthcare workers in critical areas of hospitals. The CSSD is one of them because of its critical role in infection control mechanisms. If the CSSD staff do not perform their duties as per the standard protocol, the whole sterilization process will be defeated. In view of factors that affect the spread of infection, human performance analysis within the CSSD department has become very vital. There are very few studies found in hospital practices pertaining to CSSD. By reviewing various theoretical works and empirical studies, the researcher was able to ascertain the research gaps. The quality of service and HR practices play a vital role in CSSD along with awareness and practices among the staff were carefully reviewed.

Every step in CSSD has a direct impact on infection control, patient care, and safety. Author Kasturi Shukla's study focuses on compliance related to the knowledge, attitude, and practice towards NABH standards by healthcare workers across various departments

within the hospital. The study concluded by stating the need to focus more on regular monitoring of infection control practices.

Parasuraman et.al (1985) developed a service model known as SERVQUAL views service quality as gaps between customer expectations and perceived performance. The health care sector is total quality oriented along with patient safety and care.

By continuous review of literature, it is observed that in spite of the growing trend in the healthcare sector, the quality of the service remains compromising especially in the government health sector. There is an urgent need to analyze these hospitals for their strict adherence to infection prevention and control measures (IPC).

It is variedly observed by careful study through literature reviews of various sources that there are not many studies conducted especially on CSSD staffs for analyzing their awareness and practices towards infection control, especially in the public healthcare sector, (Nagpal AK, Shriniwas. Planning and organization of the C. S. S. D. NIHAEBull. 1977;10(4):259-69. PMID: 10306428)

Maheshwar Pratap (2019) in his study has identified the limitation of the need for effective optimization of CSSD workflow techniques. The study focused on (Strategies to ensure high compliance of NABH in Multi-specialty hospitals in Pune) and identified a gap for assessment and monitoring towards infection control by focusing on compliance related to knowledge attitude and practices towards highest quality standards in the sterilization department. Seavey, Rose. (2013). (High-level disinfection, sterilization, and antisepsis: Current issues in reprocessing medical and surgical instruments. American journal of infection control. 41. S111-7. 10.1016/j.ajic.2012.09.030), study shows the gap in study stating the issues related to reprocessing surgical and medical devices to be assessed in all healthcare sectors. The study of staff knowledge in CSSD process and practices are very limited in government hospital setup.

This study aims to explore and analyze the strict adherence to infection prevention control measures at Central Sterile Supply Department. With the increase of many infectious diseases, the latest being COVID-19, still being a mystery, among the known deadly ones like Nipah Virus, Black fungi, Acquired Immune Deficiency Syndrome (AIDS), Hepatitis B, Prion disease, and many others which are known to be transmitted through environmental and transmission modes, the hospital staff, especially at CSSD, need to strictly adhere with infection prevention control (IPC) protocol to prevent any spread from the place of sterilization. The CSSD staff should have adequate knowledge and practice of IPC techniques which will decrease the incidence of cross-infection and prevents the spread of nosocomial infections.

Hence it is very much necessary to ascertain the competency of CSSD staff at regular intervals and assess the adherence of IPC. It is a continuous monitoring process and needs to be evaluated at all hospitals for optimum quality output. The objective of the study is to assess the level of awareness among the CSSD staff about nosocomial infection, best practices followed, and infrastructure compliance towards preventive measures against the spread of HAI. Gonsu, K. H. et.al. (2015). A study on Bacteriological assessment of

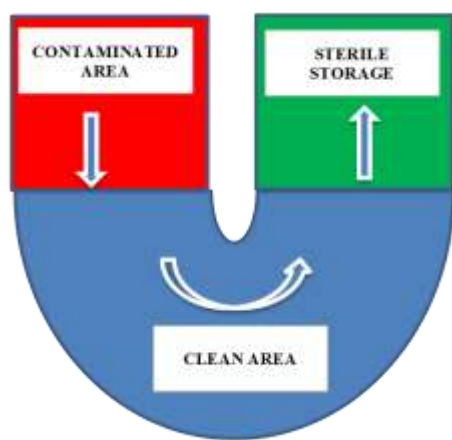


the hospital environment shows the importance of the hospital environment as a potential reservoir and source for nosocomial infection.

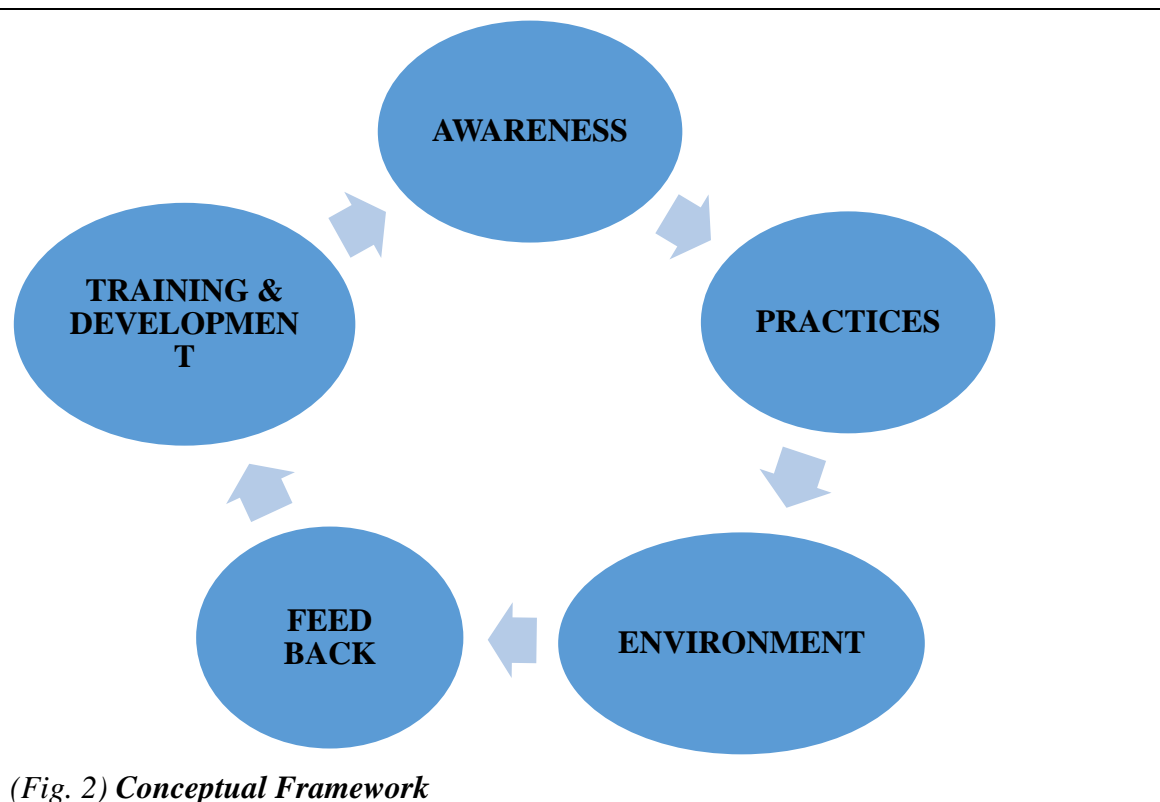
Last but not least to recommend for Infection Prevention and Control (IPC) program if called for.

**Some issues taken into consideration are:** Staff maintaining proper hygiene and strictly following the IPC methods from the very first step viz. while entering the department and receiving the contaminated goods and till the sterile items are dispatched. Preparation of the reusable medical devices after the surgery for sterilization, monitoring the IPC protocol practices, evaluating the staff's awareness and practices in preventing the spread of nosocomial diseases, and compliance with physical facilities in the prevention of the spread of infection.

(Fig.1): Unidirectional workflow pattern



## 2. Methods and Materials:



(Fig. 2) Conceptual Framework

The study adopted is a descriptive research design and involves both primary and secondary data collected from CSSD of selected public sector super specialty hospitals. Infection control & prevention awareness and practices are being observed and analyzed through a structured questionnaire at a particular department at the hospital that deals with the sterilization of medical reusable medical devices and surgical instruments, which is called as Central Sterilization Supply Department. The feedback from the end-user department where the supplies are affected and the need for improvement in observing the infection prevention and control protocol along with the training and development programs are recommended.

The self-structured questionnaire with closed-ended questions to collect data on awareness, preventive practices, and compliance of physical facilities affecting the spread of infection among the nursing staff in CSSD was framed. Based on personal expertise in this field over two decades and other referrals of human resources and medical ethics (WHO Infection prevention and control assessment framework at the facility level, 2018) (National guidelines for infection prevention and control 2020, MH&FW, India), the staffs at CSSD were interviewed and questionnaire distributed for over a period of three months (July 2021 to Sep. 2021). A simple random sampling technique is used to collect the sample size of 22 staff members from the CSSD. 5-point Likert Scale grading was adopted.

The content validity was obtained by a panel of experts in infection control and prevention at the hospital consisting of the Doctor of Pathology and Doctor of Microbiology and Nursing In-charge. The questionnaire designed for simple understanding was considered. The reliability of the questionnaire was tested using the alpha Cronbach ( $\alpha$ ) test. For awareness questions =0.83, physical facilities = .81 and for practice = .82 which is considered acceptable.

The response was recorded and analyzed by using statistical software IBM SPSS, version 26. Descriptive statistics were applied. P-value  $\leq 0.05$  was taken as statistically significant.

Prior permission was obtained from the appropriate authority for the study. The investigator personally visited the CSSD of the institution and collected data. Confidentiality of information was maintained. The purpose and content of the questionnaire were explained and verbal consent of the participant was obtained.

Secondary data references from WHO (World Health Organisation, Infection prevention, and control assessment framework at the facility, 2018, Recommendations of Centres for Disease Control and Prevention and Healthcare Infection control practices advisory committee (HICPAC), updated July 2018 and various other references from published journals related to the study of infection control and prevention. All these variables like awareness among the staff, physical facilities which would facilitate the practice and process, and adherence to the protocol of IPC are assessed in the study.

## **2.1 Hypothesis testing:**

- Null hypothesis Ho 1: The nursing staffs are fully aware of the IPC measures. (There is no significant difference among the gender in the awareness of IPC)
- Null hypothesis Ho 2: The nursing staff is practicing strict adherence to the IPC. (There is no significant difference between the gender and practices of IPC)

- Null hypothesis Ho 3: The nursing staffs agree with physical facility & design favours IPC (There is no significant difference among gender about the compliance of hospital environment in IPC)

If the p-value is > 0.05, in all of the cases, the null hypothesis is accepted.

- T-Test for gender and their awareness, practice, and physical facility (hospital environment) towards IPC.
- Levene’s test for equality of variances agrees with the null hypothesis (p-value is > 0.05, confidence level of 5%)

For detailed test results and analysis, output charts are available on request.

### 3. Findings / Results:

*Table 1: Details showing the Socio-demographic characteristics*

Count of STAFFID	Column Label								REG. NURSE Total	Grand Total
	CONTRACT			CONTRACT Total	REG. NURSE					
Row Labels	<1 yr	<1yr	1-5yrs		10yrs>	1-5yrs	6-10yrs			
<input checked="" type="checkbox"/> FEMALE	1	1	1	3	2	3	6	11	14	
<30	1	1		2		2		2	4	
31-40			1	1		1	4	5	6	
40>					2		2	4	4	
<input checked="" type="checkbox"/> MALE					2		6	8	8	
31-40							6	6	6	
40>					2			2	2	
<b>Grand Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>12</b>	<b>19</b>	<b>22</b>	

Analysis revealed that the majority of the respondents are female staff (14) (63.6%) and Male staff (8) (36.4%) There are (11) female registered nurses and (3) female contractual nurses. Out of 11 female registered nurses, (2 Nos) are aged 41> with 10> years of experience, (6 Nos) are aged between 31-40 years with 6-10 years’ experience, (3 Nos) contract nurses out of which – (2 nos.) aged less than 30 years with <1year of experience and (1 no) is aged between 31-40 years with 1-5 years of experience.

Out of 8 Male registered nurses (2 Nos) are aged 41,> with more than 10 years of experience and the rest (6 Nos) are aged between 31-40 years having 6-10 years of experience.

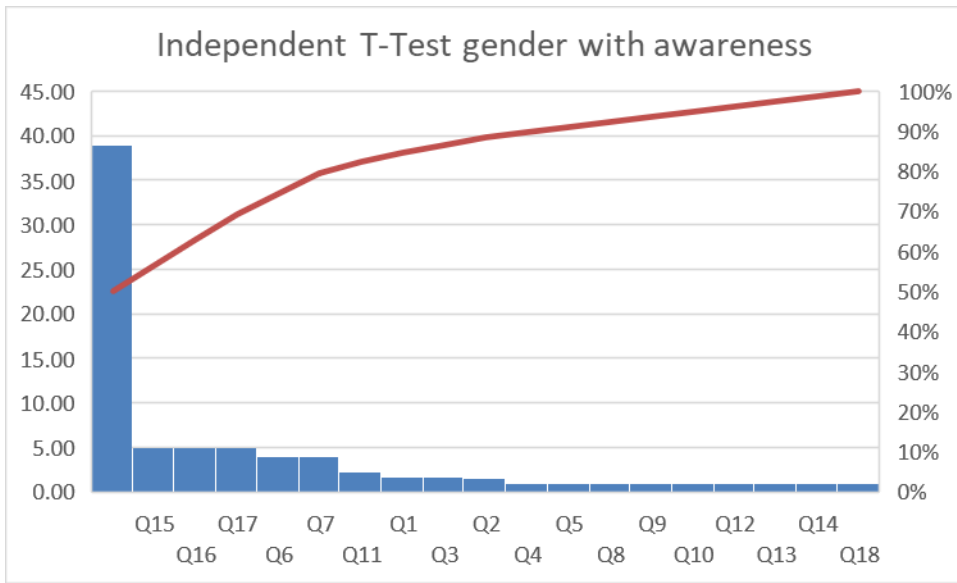
### 3.1 Test Results

#### 1) T-Test result of staff awareness of IPC:

##### Null hypothesis Ho 1: (The staffs are fully aware of the IPC measures.)

An independent t-test was conducted to compare the gender has no significance on IPC awareness. Levene’s Test for equality of variances showed no violation  $F(20) = .888, p = .414$ . The independent sample t-test was associated with statically no significant effect, there was no significant difference  $t(20) = .84, p = .605$  in scores for Males (M=2.16, SD=.14) and Females (M=2.16, SD=.12). The magnitude of the difference in the means

(mean difference =.20, 95% C.I:.56 to 0.60) was very small. There is no significance of gender in awareness regarding IPC and null hypothesis Ho 1 is accepted.

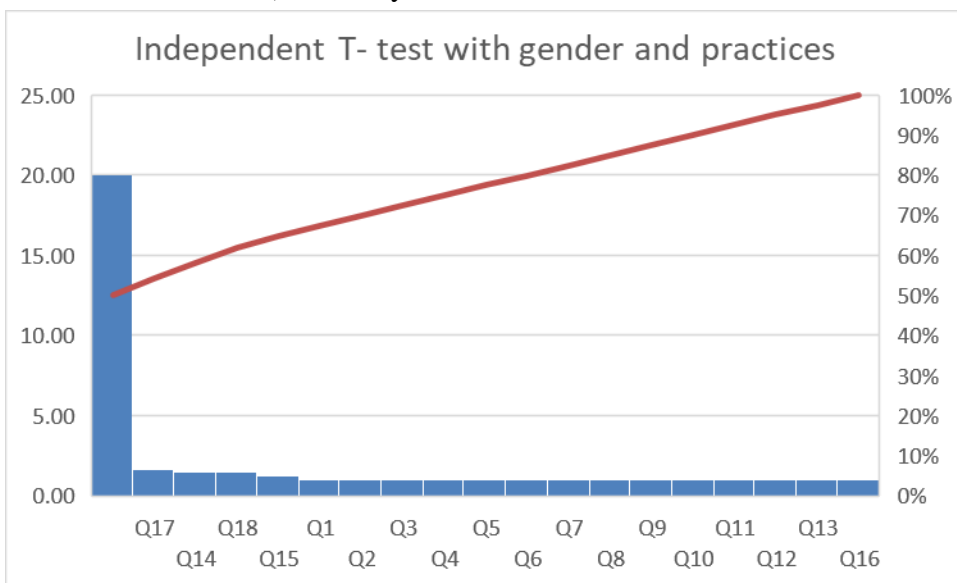


**Chart -1: Paerochart showing the mean and standard deviation among the gender with awareness.**

**2) T-Test result of staff about the practice of IPC:**

**Null hypothesis Ho 2: (The staff are practicing strict adherence to the IPC)**

An independent t-test was conducted to compare the gender has no significance on IPC awareness. Levene’s Test for equality of variances showed no violation  $F(20) = .430, p = .592$ . The independent sample t-test was associated with statically no significant effect,  $t(20) = .59, p = .590$ . There is no significance of gender and practice regarding IPC and null hypothesis Ho 2 is accepted. The scores for Males (M=.90, SD=.19) and Females (M=.90, SD=.16). The magnitude of the difference in the means (mean difference =.21, 95% C.I:0.70 to 0.76) was very small.

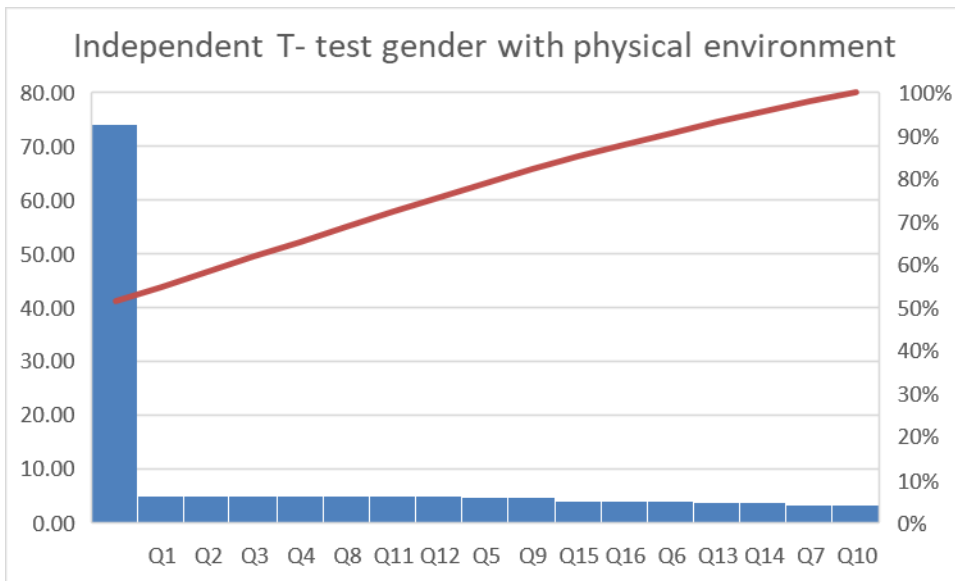


**Chart -2: Paerochart showing the mean and standard deviation among the gender with practices.**

**3) T-Test result of staff knowledge of the hospital environment affects the IPC measures.**

**Null hypothesis Ho 3: (The staffs agree with physical facility & design favours IPC)**

An independent t-test was conducted to compare the knowledge of gender about the hospital environment has significance on IPC measures. Levene’s Test for equality of variances showed no violation  $F(20) = 14.9$   $p = .187$ . The independent sample t-test was associated with statically no significant effect,  $t(20) = 2.36$ ,  $p = .161$  in scores, for Males ( $M = 4.3$ ,  $SD = .24$ ) and Females ( $M = 4.6$ ,  $SD = .18$ ). The magnitude of the difference in the means (mean difference = .06, 95% C.I.: .37 to 0.43) was very small. There is no significance of gender in the knowledge of hospital environment affect regarding IPC and null hypothesis Ho 3 is accepted.



**Chart -3: Paerochart showing the mean and standard deviation among the gender in a hospital environment.**

CSSD In-charge observational chart revealed strict adherence to the IPC protocol. The CSSD In-charge performs strict vigilance and surveillance of practices. The CSSD department is cleaned at regular intervals, and the logbook is maintained for housekeeping work. The equipment performance checks are carried out on daily basis. Biomedical waste is all disposed of as per the IPC protocol. Bacteriological swabs and water, and air testing are done on a periodic basis.

**Table 2: CSSD In-Charge - IPC protocol adherence observational table.**

S. N.	CSSD In-charge challenges asper IPC surveillance	SHIFT 1	SHIFT 2	SHIFT 3
1.	Strict Vigilance about IPC protocol adherence & process monitoring.	Yes	Yes	Yes
2.	Disinfection and cleaning of all surfaces viz. equipment, furniture, floor, all areas	Yes	No	Yes

3.	Cleaning by housekeeping, all floors, toilets, change rooms	Yes	No	Yes
4.	Disinfection of cleaning mop	Yes	No	Yes
5.	Working personnel wear PPE at different zones	Yes	Yes	Yes
6.	Staff maintaining personal hygiene, scrub, wear gloves, cap, mask	Yes	Yes	Yes
7.	Biomedical waste disposal according to the IPC protocol	Yes	Yes	Yes
8.	Equipment performance test	Yes	No	No
9.	Proper record keeping about inward, out ward, defective, recall, test reports, maintenance chart, consumables, lost and found list, accidents	Yes	Yes	Yes
10.	Fogging of different areas within the department	Conducted once in 7days		
11.	Bacteriological swab test conducted	Once in 15 days		

#### 4. Discussion:

In today's scenario when the deadly virus COVID19 pandemic is on the rise, adherence to infection prevention and control measures has become a major challenge. It is not only confined to hospital staff and healthcare workers but also for the general public to maintain hygiene. The current study assesses the healthcare workers' awareness level of infection control and prevention. Physical facilities contribute to the prevention and spread. The participants demonstrated an acceptable overall mean awareness score (16.55+- 2.69 from a total of 22). These results are consistent with European studies by D Alessandro et al, (2013), Tovolacci et. al. 2008)

About the awareness, the staff needs to be much more aware of the environmental/ physical facilities which could be a major source of HAIs. In addition to that only 68% of the staff mentioned that they were trained in treating HAIs. This highlights the need to emphasize the training for infection control and practices.

The World Health Organization (WHO) survey showed an average of 8.7% of hospital patients had healthcare-associated infections (HAI). Over 1.4 million people suffer from infectious complications acquired from the hospital. There are many reports indicating infection risks due to improper sterilization.

#### 5. Conclusion:

To conclude, the hospital's CSSD staff has adequate awareness and follows the proper practice of IPC measures. Continuous vigilance and training shall be conducted for following strict adherence to the IPC techniques and updating with the latest technology. Further studies are needed to assess IPC awareness of staff at the various department on a national level.

## 6. Limitations:

The study included only a single super specialty hospital so the results may not be generalized and do not necessarily reflect the situation in all other hospital setups. This study should bring awareness and preventive measures toward cross-infection. Our inclusion was only one particular department of central sterilization, other departments shall be considered. And limited sample size due to COVID-19 pandemic protocol. Other human resource dimensions can be utilized for analyzing the quality of performance output.

## 7. Recommendations:

During this critical hour of the COVID19 pandemic at rising, there is a very much need for such surveys in other healthcare centers to assess the awareness, knowledge, and practices of CSSD staff and other departmental staff as well against the strict adherence to IPC measures.

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## A study on Career development

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### **Abstract:**

*This study's goal is to provide a succinct picture of career progression because it might be difficult for many businesses and employees to create an efficient career development strategy. Definitions of careers and career development are covered in this study. Skill development is also considered to be a vital aspect, when a person is skilled and possesses all the capabilities and expertise then he will be able to enhance his career prospects. It is through ones career, it is determined what kind of a person an individual is, for example, if a person is a medical practitioner, he has to be caring, courteous and considerate towards his patients. In other words, a good development of a career leads to good development of one's attitude and behavioral traits Components, methods, and tactics. The career management concept is also covered, concluding with suggestions for businesses and employees.*

### **Keywords:**

Career development, succinct picture, Practitioner, Components, methods, and tactics.



## Evaluating Efficiency of Human Resource Management Strategies for Developing Small and Medium Garments Industries in Coimbatore

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### **INTRODUCTION:**

Garment industries promote the creation of product patterns and styles as well as fashion design, thus human resources should concentrate on choosing qualified personnel for both the manufacturing function and the sales and marketing departments (Loganathan & Dharmaraj 2017). Employees in the production, sales, and marketing departments are essential to the company's success, productivity, and bottom line. If HR operates globally, they should choose talented local applicants whose overall pay will probably be far lower than that of deployed employees from the home office with comparable skill levels. Different human resources are accessible in the apparel sector.

In a developing garment industry, it enhanced the production processes. The management typically provides training sessions (Hearle, 2016). Employee skill development, career advancement, and product updating for competitiveness are all aided by training programs. All of the individuals chosen for the sales and marketing department will require soft skill training, which will boost the amount of sales generated by the apparel sector. By using the HR qualification system, it is possible to determine the training needs of both new and existing garment industry personnel. For the benefit of the clothing business, align the training programs at domestic and international subsidiaries with the strategic aims and objectives of their respective industries.

HR should create a salary and compensation policy to encourage the existing workforce (Prentice 2018). Due in part to this policy, the garment industry was able to recruit and

retain talented workers. The compensation policy in the apparel business is often followed by examining the pay scales to ensure that employees are compensated fairly. Along with this, offering an incentive system based on employee performance can effectively raise worker performance. Employees may receive an instant bonus as part of the incentive program. Depending on industry legislation and labor market trends, determine pay for subsidiaries abroad.

#### **OBJECTIVE:**

- To understand the difficulties and concerns experienced by the HR of the garment businesses in the Coimbatore region, analyze both the small and medium scale industries.
- Assessing employee motivation as well as training and development can help you understand the difficulties and problems that HR faces.
- Analyzing the business environment would help researchers better understand how HRM is applied in the Coimbatore region's garment sectors.
- To improve the analysis of HRM, consider the welfare of the employees as well as employee motivation, training, and workplace culture.
- 

#### **REVIEW OF LITERATURE:**

In line with all of the retrospective literature, Kantun (2019) demonstrated the significance of human resources for the expansion and maintenance of the MSME sector and elevated them to the centre of attention for management procedures inside a business. There is a wealth of formal and professional HR machinery, but numerous researchers have discovered that HR duties are carried out in an arbitrary and chaotic manner. Humans were taught the false premise that only large-scale enterprises needed HR policies.

According to Majumdar (2019), the management of human resources should assume control over the many different organizational functions, including financing, production, marketing, and operations. This compelled the establishment of an HR mechanism into the gyration of organizational functioning.

As it was both an art and a practice, HRM functions were widely dispersed, lacked a fundamental focal point, and were very casual in style (Bambang, 2019), which was related to garments industries in India.

Although there is a rising body of academics that emphasize the value of human resources in enterprises, it is perplexing to realize that there is scant empirical support for these claims and that the effects of HR practices are fleeting (Zheng et al, 2019).

The western definition of HRM was a tool for maximizing and unleashing the potential of the human resources and preparing people with information, skills, and training to achieve garments industry development (Rathi, 2019).

The challenges were very high to be faced by the HRM owing to the precipitous growth in the technological implements and the arenas for development which it had open end (Lestari, 2019).

Lee(2019) pointed out that HRM system was highly reliant upon the nature of the job which breeds an escalated level of onus and employees professional and personal growth trajectory, the spiked productivity that ensued due to the result of increasing responsibilities and organization to be seen in an open system.

The ability of garments industry to adopt HR practices had been discovered, and managers had the chance to learn about the possibilities and implementation details for HR systems (Han, 2019).

### **EMOTIONAL INTELLIGENCE :**

The academic community had discovered that workers with a high emotional intelligence quotient were better equipped and able to forecast work-related outcomes at the workplace (Benbassat, 2019).

WEN 2019 – “**International Journal of Hospitality Management**” Despite the fact that the idea of emotional intelligence was relatively new—it was originally introduced by Peter Salovey and John Mayor in 1990

In order to create competent teams and align a person's goals with the goals of the company, which leads to operational efficiency, emotions can collectively link and network with one another to form a swarm of emotional intelligence (Karasneh, 2019).

An employee with a higher level of emotional intelligence will be better able to manage work-related stress because they will be better able to understand the amount of stress in their businesses and develop better coping mechanisms and strategies to reduce the stress factor (Coibanu, 2019).

### **JOB SATISFACTION:**

Job satisfaction was the result of continuous efforts to communicate on three levels: peer to peer, subordinate to superior, and lastly the final trinity tranche of the superior to the subordinate (Yang, 2020).

Job satisfaction scores revealed the organizational effectiveness of the company and were discovered to be of the utmost importance for the organization to attain productivity, proficiency, and larger output creation, which would be beneficial to the management of human resources (Kim, 2020).

The researcher observed that Job Satisfaction, a sub-construct of Organizational Performance, was directly correlated with the level of Emotional Intelligence (Jade, 2019).

The researcher even stated that money was listed as a very low satisfaction factor. The job satisfaction level of the nurses was mostly due to exciting and demanding work that was followed by a sense of accomplishment ( Hsu 2019).

According to Saks (2019), an organization's environment design has a significant impact on both job satisfaction and staff involvement in their work.

It had been discovered that employer with higher satisfaction quotients were more likely to generously contribute to organizational goals and align their personal objectives with those of the industry, leading to organizational efficiency in terms of cost, quality, speed, and competent innovations (Addis, 2019).

According to the theories of job satisfaction cited by Herzberg, incentives such as bonuses and differential pay plans do not necessarily result in a perfect smug factor spawning within the organization. Instead, a preponderance of attention to psychologically innate intrinsic factors such as recognition, cultural affiliation and belief systems, work delegation, and increased responsibilities led to greater job satisfaction and, ultimately, organizational efficiency. ( 2019 Megheirkouni ).

### **TRAINING:**

Only when there was a strong presence of a trained workforce with an adequate quantity of skills, which will ultimately lead to better developmental capabilities, increased profitability, and ultimately industry efficiency, could aggressive expansion plans for the garments industry to be realized and catalyzed (Eby, 2019).

With the MSME sector now having the second-largest pool of workers, creating jobs is essential since the globalized world needs high-quality goods, which can only be produced by a qualified, trained workforce that fosters industry effectiveness (Mira, 2019).

When international small size firms made significant investments in employee training, research, development, and innovation that increased operational efficiency, they acquired the novice phrase "training investment" (Jakobsen, 2019).

### **TRUST:**

Trust was crucial in creating a strong covenant, reducing injustices and mishaps, forging cheek by jowl relationships among the workers, and acting as a lynchpin for mutual cooperation between workers and employers, all of which contributed to operational efficiency whenever the industry was in dire straits and operational efficiency began to thaw (Kerse, 2019).

It was alarming to see that there was a positive and significant association in the literature between these two factors because trust had been the key to tying together human to human coordination, which eventually resulted in operational efficiency in the organization (Oztruk, 2019).

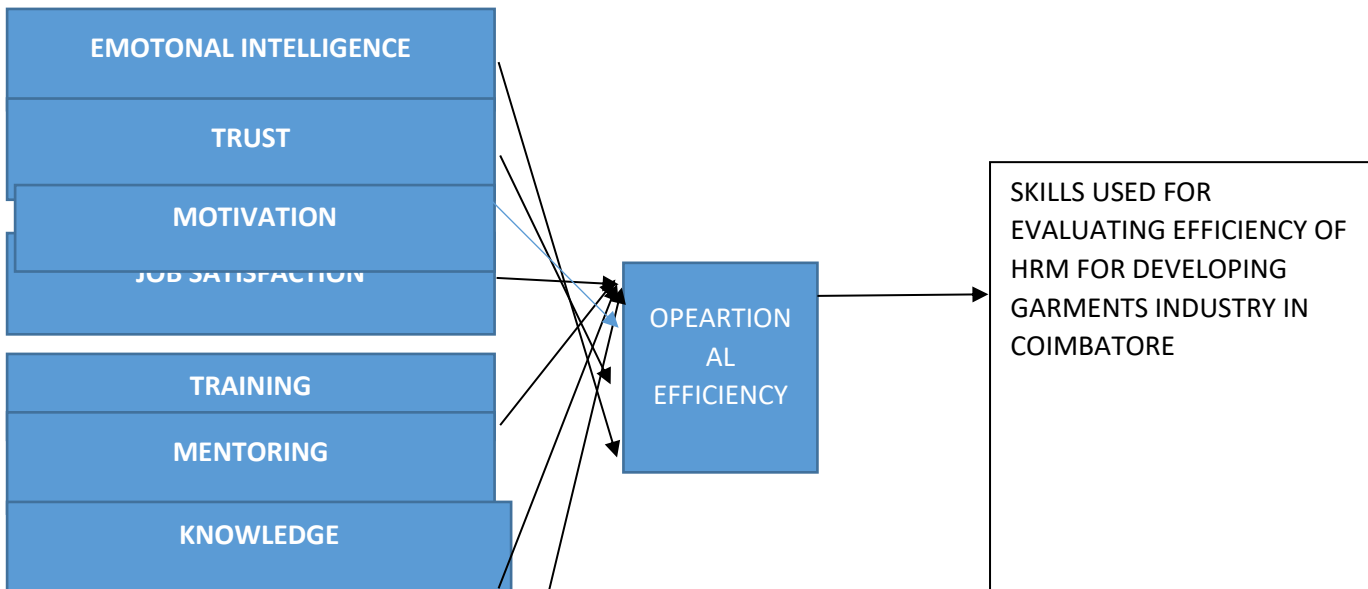
Trust produced a strong connection that accelerated high-level cooperation, a better work environment, an elevated quotient of loyalty, and the adoption of belief systems, all of which ultimately resulted in greater productivity and operational efficiency (Goyal, 2019).

### **RESEARCH GAP:**

- To bridge a gap between Emotional Intelligence & work life balance.
- To find how training is effective for an individual to grow up
- To find out how the employee find the trust in work.

- To find how the Job Satisfaction is really important for an employee.

### CONCEPTUAL MODEL:



### RESEARCH METHODOLOGY:

#### RESEARCH DESIGN:

The descriptive research is used in this study for evaluating efficiency of Human Management strategies for developing garments industry in Coimbatore.

I have gathered the information through Journal, news letter and College library.

#### SAMPLE DESIGN:

##### POPULATION:

The population of the study was represented by employees from Garments industries in Coimbatore.

##### SAMPLING UNIT:

The sampling unit for "EVALUATING EFFICIENCY OF HUMAN RESOURCE STRATEGIES FOR DEVELOPING GARMENTS INDUSTRIES IN COIMBATORE" is 50 sampling unit.

##### DATA COLLECTION PLAN:

I have gathered Primary data and Secondary data.

##### PRIMARY DATA:

I have gathered the information through questionnaire.

##### SECONDARY DATA:

I have gathered the information from books, journal, news paper and college library.

##### TOOLS USED FOR DATA ANALYSIS:

Collected data will be coded based on Graphical method.

##### HYPOTHESIS:

**H<sub>0</sub> – NULL HYPOTHESIS:**

There is no significance relationship between independent variable.

**H<sub>1</sub> – EMOTIONAL INTELLIGENCE AND OPERATIONAL EFFICECY:**

There is a significance relationship between Emotional Intelligence and the operational efficiency.

**H<sub>2</sub> – TRUST AND OPERATIONAL EFFICIENCY:**

There is a significance relationship between Trust and Operational Efficiency.

**H<sub>3</sub> – MOTIVATION AND OPERATIONAL EFFICIENCY:**

There is a significant relationship between Motivation and Operational Efficiency.

**H<sub>4</sub> – JOB SATISFACTION AND OPERATIONAL EFFICIENCY:**

There is a significant relationship between Job satisfaction and operational efficicny.

**H<sub>5</sub> – TRAINING AND OPERATIONAL EFFICIENCY:**

There is a significant relationship between Training and Operational efficiency.

**H<sub>6</sub> - MENTORING AND OPERATIONAL EFFICIENCY:**

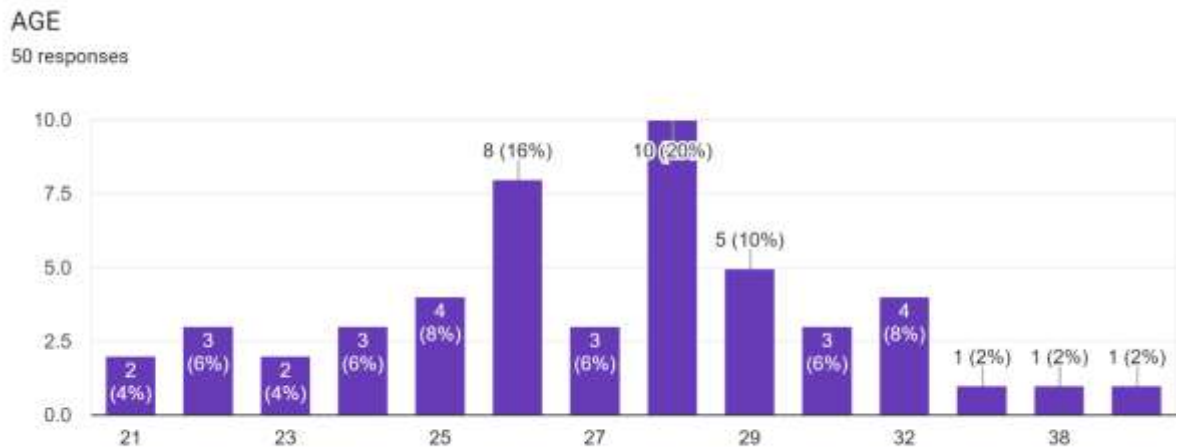
There is a significant relationship between Mentoring and Operational Efficiency.

**H<sub>7</sub> – KNOWLEDGE AND OPEATIONAL EFFICIENCY:**

There is a significant relationship between Knowledge and Operational Efficiency.

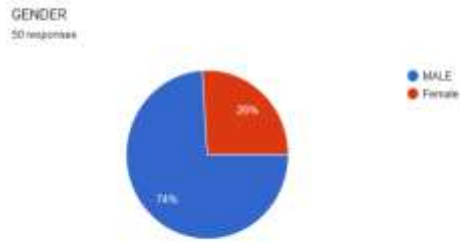
**DATA INTERPRETATION:**

**AGE:**



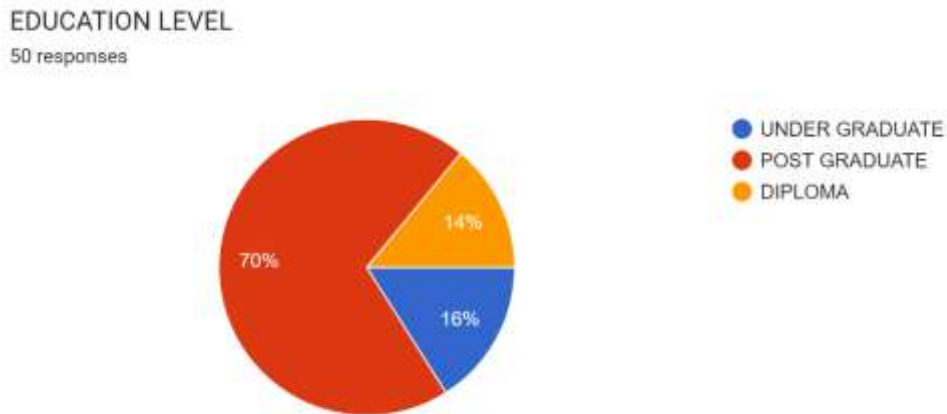
When it comes to age of the employees there are 10 employees ( 20 % ) with the age of 28. And the minimum number of employees is 1 ( 2% ) in 35 and 40 age respectively.

**GENDER:**



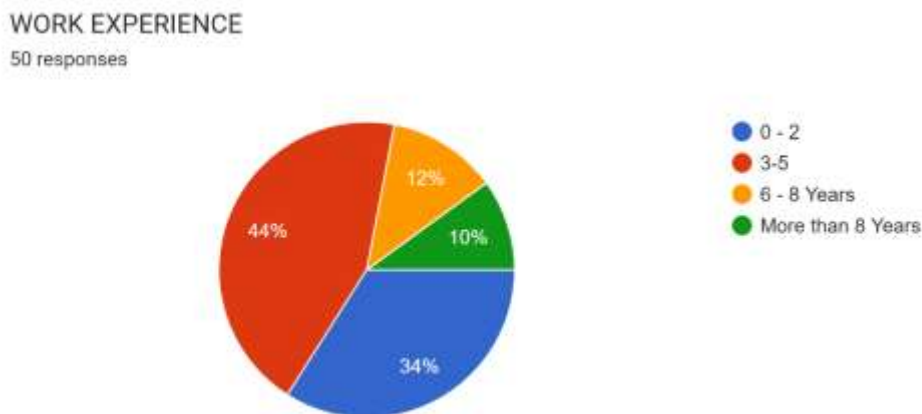
When it comes to gender there are maximum of 37 ( 74% ) as Male and 13 ( 26% ) of Female workers in Garments industries in Coimbatore.

**EDUCATION LEVEL:**



When it comes to education there are maximum of 35 ( 70 % ) workers are undergraduate, 7 ( 14 % ) workers are Post Graduate, and Minimum of 8 ( 16 % ) workers are diploma.

**WORKING EXPERIENCE:**

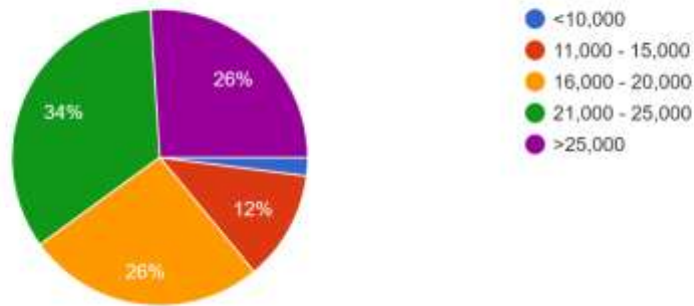


There are Maximum of 22 ( 44 % ) of workers as 3 – 5 work experience. There are 17 (34%) workers from the experience (0 – 2 ) years. There are 5 (10%) of workers from the experience of more than 8 years. There are 6 (12%) of workers from the experience 6 – 8 years.

**INCOME LEVEL:**

**INCOME LEVEL**

50 responses

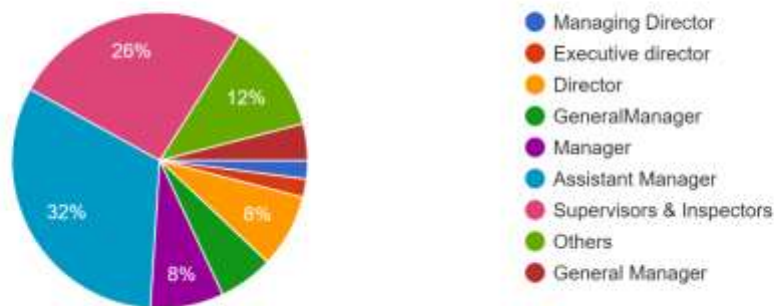


There is maximum of 17 (34%) of workers with the income level of 21,000 – 25,000. There is 13 (26%) of workers with the income level of 16,000 – 20,000. There is 6 (12%) of workers with the income level of 11,000 – 15,000. There is 1 (2%) of workers with the income level of less than 10,000. There is 13 (26%) of workers with the income level of greater than 25,000.

**DESIGNATION:**

**Designation**

50 responses



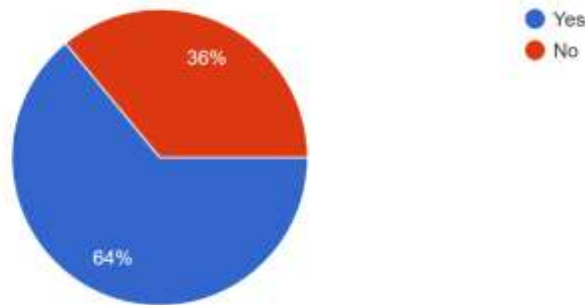
- There is a maximum of 16 (32 %) of Assistant Manager designation of workers in Garments industries.
- There is 4 (8%) of manager designation of workers in Garments industries in Coimbatore. There is 3 (6%) of general manager designation of workers in Garments industries in Coimbatore.
- There is 4 (8%) of directors' designation of workers in Garments industries in Coimbatore.
- There is 1 (2%) of executive directors' designation of workers in Garments Industries in Coimbatore.
- There are 1 (2%) of managing director's designation of workers in Garments Industries in Coimbatore.
- There are 2 (4%) of general manager's designation workers in Garments industries in Coimbatore.



- There are 6 (12%) of others workers designation workers in Garments Industries Coimbatore.
- There are 13 (26%) of Supervisors and Inspectors designation of workers in Garments Industries Coimbatore.

**ARE YOU MIGATED WITH YOUR FAMILY:**

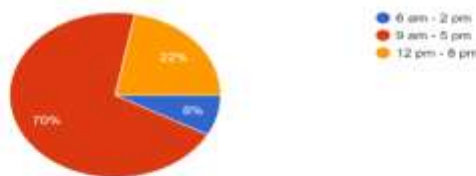
ARE YOU MIGATED WITH YOUR FAMILY  
50 responses



There are 32 (64%) of workers migrated with there family and 18 (36%) of workers are not migrated with their families.

**WORK SCHEDULE:**

WORK SCHEDULE  
50 responses



are  
of 35

- There maximum (70%) of workers working

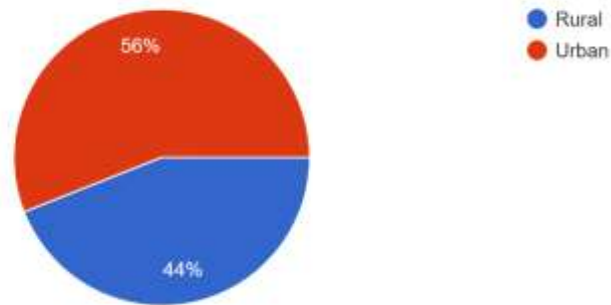
from 9 am to 5 pm.

- There are minimum of 4 (8%) of workers working from 6 am to 2 pm.
- There are 11 (22%) of workers working from 12 pm to 8 pm.

### AREA OF RESIDENCY:

AREA OF RESIDENCY

50 responses

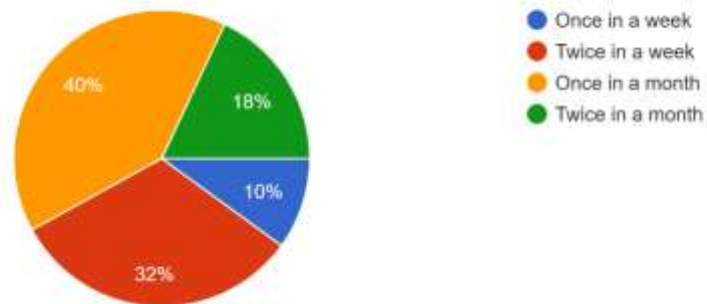


There are maximum of 28 (56%) workers from Urban areas and minimum of 22 (44%) of workers from Rural areas.

### FREQUENCY OF TRAINING PROGRAMME:

FREQUENCY OF TRAINING PROGRAM

50 responses

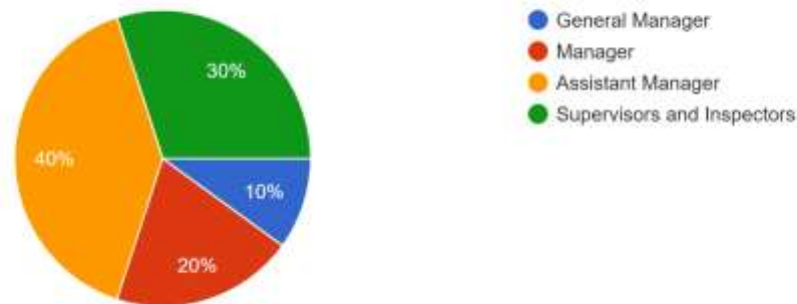


- There are maximum 20 (40%) of training program is conducted once in a month.
- There are 5 (10%) of training program is conducted once in a week.
- There are 16 (32%) of training program is conducted twice in a week.
- There are 9 (18%) of training program is conducted twice in a month.

## WHO IS GIVING TRAINING TO YOUR EMPLOYEES IN YOUR ORGANIZATION:

WHO IS GIVING TRAINING TO EMPLOYEES IN YOUR ORGANIZATION

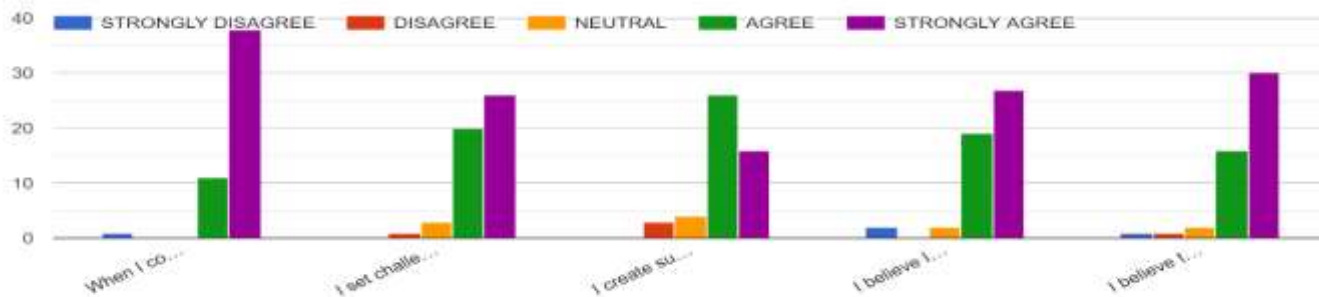
50 responses



- There are maximum of 20 (40%) of Assistant Manager give training in the organization.
- There are minimum of 5 (10%) of General manager give training in the organization.
- There are 15 (30%) of Supervisors and Inspectors give training in the organization.
- There are 10 (20%) of Managers give training in he organization.

## EMOTIONAL INTELLIGENCE:

EMOTIONAL INTELLIGENCE



1. When I contribute to the group discussions, I believe my contributions are as valuable as those of others.

STRONGLY AGREE - 38

AGREE - 11

STRONGLY DISAGREE - 1

2. I set challenging goals for myself and strive to achieve them.

STRONGLY AGREE - 26

AGREE - 20

NEUTRAL - 3

DISAGREE - 1

3. I create such an atmosphere where people enthusiastically interact and participate in team

work.

STRONGLY AGREE - 16  
 AGREE - 26  
 NEUTRAL - 04  
 DISAGREE - 03  
 STRONGLY DISAGREE - 01

4. I believe I am able to maintain balance between my personnel, social life and educational

life.

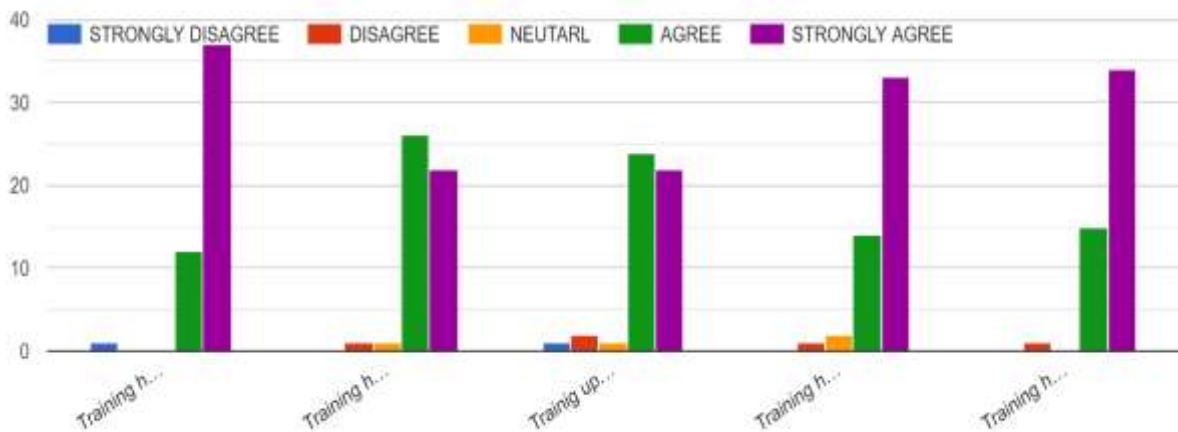
STRONGLY AGREE - 27  
 AGREE - 19  
 NEUTRAL - 02  
 STRONGLY DISAGREE - 01

5. I believe that I stay focus on my performance.

STRONGLY AGREE - 30  
 AGREE - 16  
 NEUTRAL - 02  
 DISAGREE - 01  
 STRONGLY DISAGREE - 01

**TRAINING:**

TRAINING



1. Training helps me to become aware of my strong and week points and development needs.

STRONGLY AGREE - 37  
 AGREE - 12  
 STRONGLY DISAGREE - 01

2. Training has helped me to plan out of my job to complete work in schedule time.

STRONGLY AGREE – 22  
 AGREE - 26  
 NEUTRAL - 01  
 DISAGREE - 01

3. Training updates me on technology and economic changes that helps to make better decision.

STRONGLY AGREE – 22  
 AGREE - 24  
 NEUTRAL - 01  
 DISAGREE - 02  
 STRONGLY DISAGREE – 01

4. Training has improved my performance and helps in achieving higher targets.

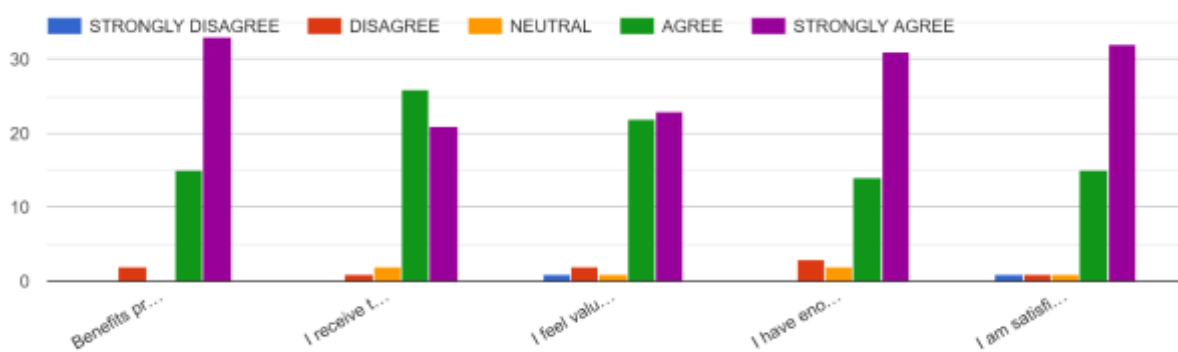
STRONGLY AGREE - 33  
 AGREE - 14  
 NEUTRAL - 02  
 DISAGREE - 01

5. Training has helped me to identify my skill.

STRONGLY AGREE - 34  
 AGREE - 15  
 DISAGREE - 01

**JOB SATISFACTION:**

JOB SATISFACTION



1. Benefits provided by the company are fair and reasonable.

STRONGLY AGREE – 33  
 AGREE - 15  
 DISAGREE - 02

2. I receive the recognition that I deserve for my work contribution.

STRONGLY AGREE – 21  
 AGREE - 26  
 NEUTRAL - 02  
 DISAGREE - 01

3. I feel valued for my contribution in organization.

STRONGLY AGREE – 23  
 AGREE - 22  
 NEUTRAL - 01  
 DISAGREE - 02  
 STRONGLY DISAGREE - 01

4. I have enough freedom to do what I want to do in my job.

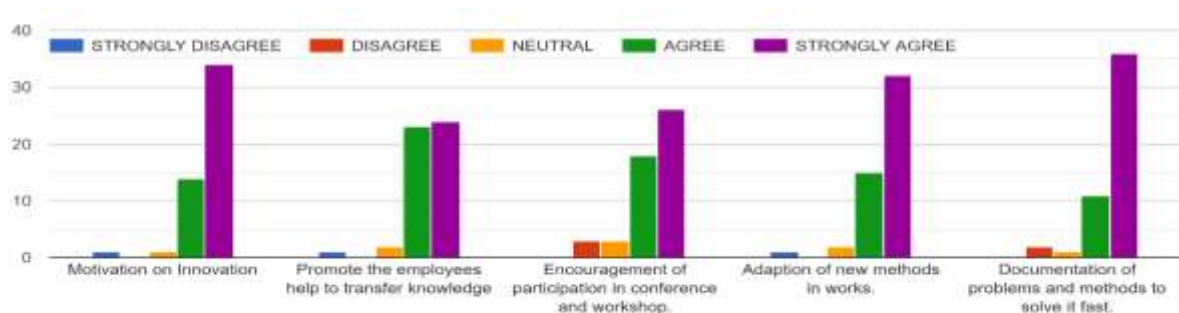
STRONGLY AGREE - 31  
 AGREE - 14  
 NEUTRAL - 02  
 DISAGREE - 03

5. I am satisfied with the opportunities my job provides me to interact with others.

STRONGLY AGREE - 32  
 AGREE - 15  
 NEUTRAL - 01  
 DISAGREE - 01  
 STRONGLY DISAGREE - 01

**KNOELEDGE:**

KNOWLEDGE



1. Motivation on innovation.

STRONGLY AGREE - 34  
 AGREE - 14  
 NEUTRAL - 01  
 STRONGLY DISAGREE - 01

2. Promotes the employees helps to transfer knowledge.

STRONGLY AGREE	- 24
AGREE	- 23
NEUTRAL	- 02
STRONGLY DISAGREE	- 01

3. Encouragement of participation in conference and workshop.

STRONGLY AGREE	- 26
AGREE	- 18
NEUTRAL	- 03
DISAGREE	- 03

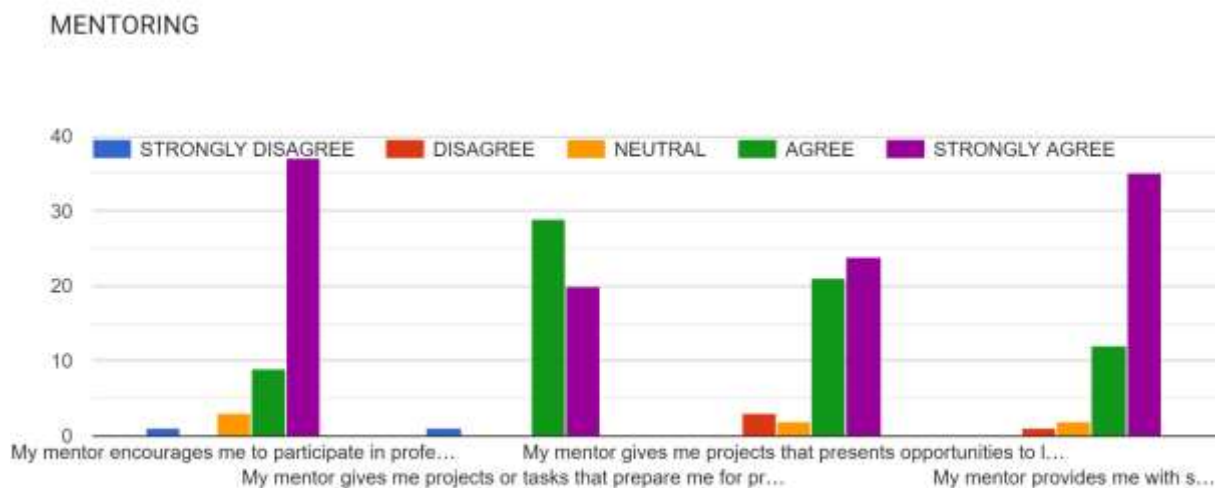
4. Adaption of new methods in works.

STRONGLY AGREE	- 32
AGREE	- 15
NEUTRAL	- 02
STRONGLY DISAGREE	- 01

5. Documentation of problems and methods to solve it fast.

STROGLY AGREE	- 36
AGREE	- 11
NEUTRAL	- 01
DISAGREE	- 02

**MENTORING:**



1. My mentor encourages me to participate in professional developmental / growth activities.

STRONGLY AGREE	- 37
AGREE	- 09
NEUTRAL	- 03
STRONGLY DISAGREE	- 01

2. My mentor provides me projects or tasks that prepares me for professional growth.

STRONGLY AGREE - 20  
 AGREE - 29  
 STRONGLY DISAGREE - 01

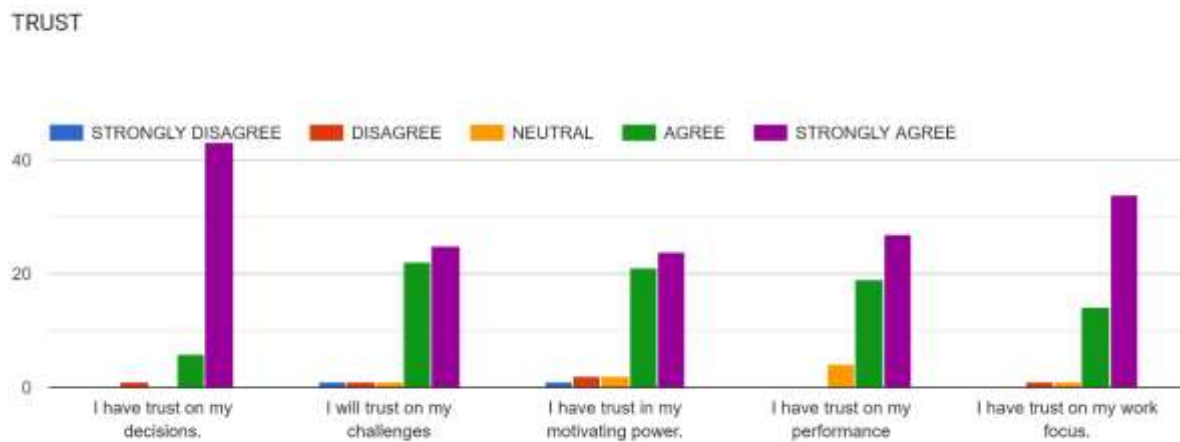
3. My mentor gives me projects that presents opportunities to learn new skills.

STRONGLY AGREE - 24  
 AGREE - 21  
 NEUTRAL - 02  
 DISAREE - 03

4. My mentor provides me with support and feedback regarding my work performance.

STRONGLY AGREE – 35  
 AGREE - 12  
 NEUTRAL - 02  
 DISAGREE - 01

**TRUST:**



1. I have trust on my decisions

STRONGLY AGREE - 43  
 AGREE - 06  
 DISAGREE - 01

2. I will trust on my challenges.

STRONGLY AGREE - 25  
 AGREE - 22  
 NEUTRAL - 01  
 DISAGREE - 01  
 STRONGLY DISAGREE - 01

3. I have trust in my motivating power.



STRONGLY AGREE	- 24
AGREE	- 21
NEUTRAL	- 02
DISAGREE	- 02
STRONGLY DISAGREE	- 01

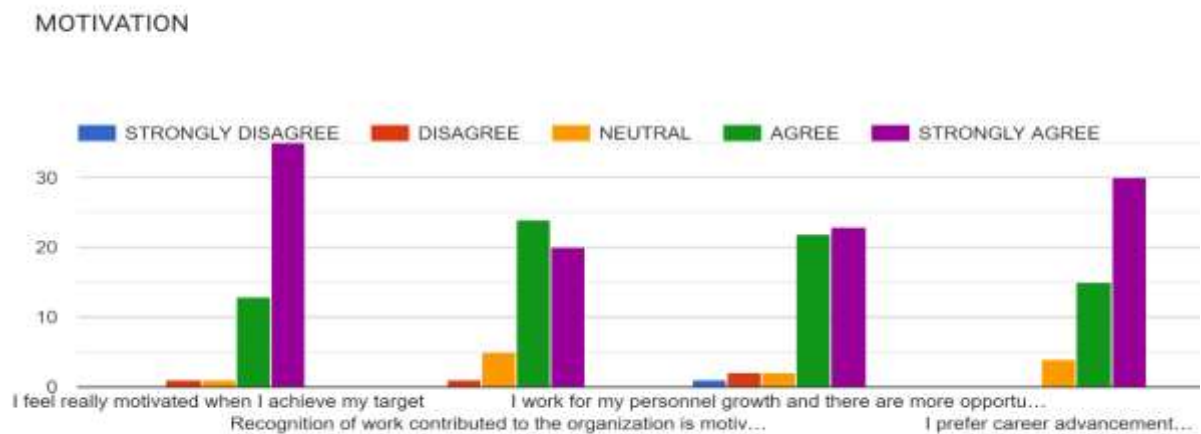
4. I have trust on my performance.

STRONGLY AGREE	- 27
AGREE	- 19
NEUTRAL	- 04

5. I have trust on my work focus.

STRONGLY AGREE	- 34
AGREE	- 14
NEUTRAL	- 01
DISAGREE	- 01

**MOTIVATION:**



1. I feel really motivated when I achieve my target.

STRONGLY AGREE	- 35
AGREE	- 13
NEUTRAL	- 01
DISAGREE	- 01

2. Recognition of work contributed to the organization is motivated for me.

STRONGLY AGREE	- 20
AGREE	- 24
NEUTRAL	- 05
DISAGREE	- 01

3. I work for my personal growth and there are more opportunity for further growth.

STRONG AGREE	- 23
AGREE	- 22

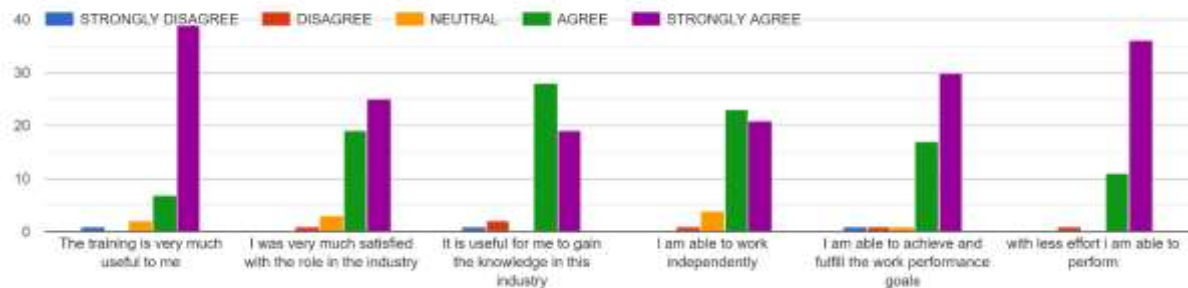
NEUTRAL - 02  
 DISAGREE - 01

4. I prefer career advancement as my personal growth.

STRONGLY AGREE - 30  
 AGREE - 15  
 NEUTRAL - 04  
 DISAGREE - 01

**OPERATIONAL EFFICIENCY:**

OPERATIONAL EFFICIENCY



1. The training is very much useful to me.

STRONGLY AGREE - 39  
 AGREE - 07  
 NEUTRAL - 02  
 DISAGREE - 01  
 STRONGLY DISAGREE - 01

2. I was very much satisfied with the role in the industry.

STRONGLY AGREE - 25  
 AGREE - 19  
 NEUTRAL - 03  
 DISAGREE - 01

3. It is useful for me to gain the knowledge in this industry.

STRONGY AGREE - 19  
 AGREE - 28  
 DISAGREE - 02  
 STRONGLY AGREE - 01

4. I am able to work independently.

STRONGLY AGREE - 24  
 AGREE - 21  
 NEUTRAL - 04  
 DISAGREE - 01

5. I am able to achieve and fulfill the work performance goals.

STRONGLY AGREE	- 30
AGREE	- 17
NEUTRAL	- 01
DISAGREE	- 01
STRONGLY DISAGREE	- 01

6. With less effort I am able to perform.

STRONGLY AGREE	- 36
AGREE	- 11
NEUTRAL	- 02
DISAGREE	- 01

### **FINDINGS:**

There are several findings in the research study:

- In my research there are maximum number of employees are from the age 28 ( 10 employees)
- In my research there are more Male employees than Female employees
- In my research study there are maximum number of employees from Under graduate 35 ( 70 % ) and minimum of 7 employees from Diploma (14%)
- In my research study there are maximum number of employees having the working experience of 3 – 5 years ( 22 to 44% ) and the minimum of more than 8 years ( 5 to 10% )
- In my research study there are maximum number of employees with the income level of 21,000 – 25,000 ( 17 employees 34% ) and minimum of less than 10,000 ( 1 of 2% )
- In my research study there is a maximum of Assistant Manager designation ( 16 of 32% ) and minimum of managing director and executive director ( 1 of 2% )
- In my research study there are maximum number of employees migrated with there family. ( 32 of 64% ) and minimum number of employees who are not migrated with their family ( 18 of 36% ).
- In my study there are maximum number of employees have the working schedule of 9 am to 5 pm ( 35 of 70%). And minimum of employees working schedule of 6 am to 2 pm ( 4 of 8% )
- In my study there are more number of employees from Urban residency ( 28 of 56% ) and Rural residency (22 of 44%)
- In my study there are Maximum number of employees are trained by Assistant Managers ( 20 of 40% ) and Minimum number of employees are trained by General Managers ( 5 to 10% ).

### **SUGGESTIONS:**

- The garment businesses in the Coimbatore region should actively implement continuous and systematic training to help increase workforce productivity. The main

training method for employees used in the garment industries is on-the-job training, which generally satisfies the need. However, it is the periodicity that should be considered, first identifying those who lack the necessary productive pace, and then implementing continuous and systematic training would eventually increase the precision and speed of the employees, which in the long run would result in an improved productivity of employees.

- With the exception of one or two small-scale garment industries, the canteen services were not up to par with the employees' expectations on the whole in the garment industries. The management claims that the garment industries' current financial situation prevents them from providing the expected levels of canteen services, and as a result, the management should consider providing a justified food allowance or canteen allowance until it is able to support the expected level of canteen services financially.
- Employees in the majority of the garment sectors have expressed their opinion that, while the management occasionally appreciates and rewards employees for their innovative ideas and proposals, it frequently does not take into account the practicality of their ideas. In order to foster a sense of community and pride among the workforce, management should implement employee suggestions and ideas without hesitation if they deem them to be viable.
- It has been observed that there aren't many differences in the pay scales for workers in the worker category in several textile sectors based on their level of experience. The majority of employees who have worked for their company for a quarter of a century or more do not receive the wage that they should be receiving given their expertise.
- Therefore, the essential actions to fix it should be taken.

### **CONCLUSION:**

- The same conceptual model could be tested on all genders for further study. The study's main weakness was that it focused solely on male participants while having a strict context and content focus.
- Large organizations with a diverse workforce and varied cultures could be the setting for the study. Furthermore, it was discovered that the independent variables had some correlations with one another, which could be investigated further in future research.
- It will be intriguing if the same variables are examined in a different workplace and ethnic ecology because the variables selected may differ in the Indian context.
- Future study that will mine more variables that could affect organizational efficiency and contribute to the development and growth of the MSME sector may analyse the moderating effects of the independent variables on organizational efficiency.
- Future studies could compare the HHR procedures used in the Southern Chennai region's apparel manufacturing industry.

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# The Influence of Leadership and Other Behavioral Competencies on Project Performance in the Construction Industry.

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## **Abstract**

*Leadership skills are very important in management of all construction projects as it influences the project outcome in multiple ways. The main objective of this paper is to analyze how certain leadership styles such as Ethical leadership, Transformational Leadership, Transactional Leadership, Democratic leadership and Authoritarian Leadership affect the project performance and if there is any direct correlation between these leadership styles and project success ratio in the construction. The study attempts to explore following major concerns through a quantitative research analysis: 1. Does Awareness lack in the construction industry concerning leadership and its influence on project performance, 2. Is there a link between the leadership behavior of a leader and the project performance and 3. Does leadership behavior of a project manager impact subordinate employees' productivity and job satisfaction. To investigate how leadership influences project success in the construction industry and its impact on project performance mainly in terms of time and cost and also employees' job commitment and job satisfaction, a complete a self-structured questionnaire survey was floated to middle management and top management professionals from various large and medium scale construction projects. The results reveal that there is a lack of awareness, willingness and specific initiatives in the construction industry related to leadership and its influence on project performance. The study highlights that the growth of an individual, as well as the organizational growth is influenced by leadership styles. It has an impact on the creativity and productivity of a team in reaching the goal. The main contribution of the study is that it incorporates all leadership styles and also analyses its impact not only on project performance but also on employees' commitment and job satisfaction. The study results would be immensely useful for policy makers, industry practitioners and academic researchers for understanding the leadership influence and its impact on project performance in construction sector.*

**KEYWORDS:** Leadership styles, Project performance, Leadership influence in construction, Employee commitment, Employee job satisfaction.

# The Influence of Digitalization in Enabling Employee Engagement and Building Belongingness in the Workplace

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## **Abstract:**

*The aim of this research paper is to study the tripartite relationship between 'digitalization', 'employee engagement' and 'belongingness' – important factors that affect employees in today's evolving workplace. Based on insights drawn from research, the authors study the 'maturity levels of digitalization' and its influence on 'maturity levels of employee engagement' within the enterprise and suggest ways and means to strengthen the interrelationships between the two so as to have a positive impact on creating 'belongingness' in the workplace. The authors also endeavor to bring a better understanding of 'levels of digitalization' by classifying these efforts as 'nascent', 'evolving' and 'outmatched'. The authors conclude that a 'balanced approach' to digitalization works best to enhance employee engagement and belongingness at the workplace. The authors have also studied 'barriers to belongingness' and provided suggestions on how to improve employee engagement, thereby contributing to increased 'belongingness' in the workplace.*

## **Keywords:**

Digitalization, Employee Engagement, Belongingness, Digital Transformation, Levels of Digitalization, Balanced Approach, Barriers to Belongingness

## **1. Introduction:**

Interest in the field of employee engagement is gaining prominence in the evolving subject of HR (Chalofsky, 2010; Chalofsky and Krishna, 2009; Czarnowsky, 2008; Ketter, 2008; Macey and Schneider, 2008; Zigarmi, Nimon, Houson, Witt, and Diehl, 2009). Albeit no broadly acknowledged definition of worker engagement is right now being used, it has been as of late characterized in the HRD writing as “an individual employee’s cognitive, emotional, and behavioural state directed toward desired organizational outcomes” (Shuck & Wollard, 2010, p. 103)

Conceptualized as a positive mental condition of motivation with behavioural appearances, study has (Harter, Schmidt, and Hayes, 2002; Saks, 2006; Shuck, Reio, and

Rocco, in press) demonstrated that the idea of engagement provides an essential relationship to organizational and outcome factors, for example, the extent of additional effort and expectation to stay with organization (Shuck, 2010) and overall performance (Rich, LePine, and Crawford, 2010). Therefore, numerous companies share the conviction that in an advancing universal talent marketplace where learning is turning into a product / commodity (Kroth and Keeler, 2009; Pink, 2001), engagement is an irrefutable source of competitive advantage across the broad spectrum of areas where the company operates (Schwartz, 2011).

Nonetheless, as the idea of engagement has developed in over time, it has experienced noteworthy changes in definition, estimation, and conceptualization (Bakker and Demerouti, 2008; Wefald, 2008). Scholarly community research to some degree is somewhat behind (Macey and Schneider, 2008), albeit thorough scholarly research has risen (see, for instance, Christian, Garza, and Slaughter, 2011; Maslach, Schaufeli, and Leiter, 2001; Rich et al., 2010; Saks, 2006). In any case, such development has brought about a huge crevice of comprehension on the subject (Macey and Schneider, 2008; Wefald, 2008), its history, what's more, current use in HRD (Shuck and Wollard, 2010).

Kahn (1990) is broadly credited with the primary application and utilization of engagement hypothesis to the work place (Harter et al., 2002; Rich et al., 2010). The term engagement was particularly used to portray an employee's contribution in different areas at work - this was first brought out in in Kahn's article the "Psychological Conditions of Personal Engagement and Disengagement at Work" which showed up in a 1990 version of the Academy of Management Journal.

In his ethnographic study, Kahn (1990) met 32 representatives, 16 summer camp counsellors and 16 professionals from the area of finance, to investigate how their encounters with different work factors (i.e., manager fulfilment, work clarity, accessibility to resources) impacted their experience and contribution with work assignments, at last affecting overwhelming musings about what might be referred to in the well-known press as "employee engagement".

Kahn postulated that engagement in work was thought to be a motivational variable spreading over the outward and inherent continuum, advancing the utilization of an employee's full self in their work. Kahn (1990) went ahead to characterize engagement as "the simultaneous employment and expression of a person's 'preferred self' in task behaviours that promote connections to work and to others, personal presence, and active full role performances" (p. 700). Notwithstanding utilizing one's full self as a part of work, Kahn recommended that an employee could be physically, emotionally and psychologically connected (Rich et al., 2010) and that these conditions of being were influenced altogether by three mental spaces: outcomes from work, security, and accessibility (Kahn, 1990).

Maslach et al. (2001) conceptualized engagement as the positive absolute opposite to burnout, characterizing engagement as "a persistent positive affective state . . . characterized by high levels of activation and pleasure" (p. 417). At the time, the burnout writing was commanded by two qualities: (a) burnout was connected with jobs where employees were in charge of communicating with individuals in stressful circumstances

(i.e., medicinal services, client relations) and (b) it was comprehended as the direct opposite to occupation engagement (Maslach et al., 2001). Specialists in the burnout writing started considering the part of prosperity as a component of engagement and a methodology for streamlining human quality.

Burnout was thought to be the disintegration of engagement (Maslach et al., 2001); what was once critical, significant, and testing work got to be repulsive, unfulfilling, and pointless (Maslach et al., 2001, p. 416). Additionally, engagement was operationalized as the switch of scores on the Maslach Burnout Inventory (MBI-GS; Maslach and Leiter, 1997). As needs be, engagement was portrayed as the inverse of the three burnout measurements: fatigue, scepticism, and insufficiency.

As an outgrowth of the development in the field of psychology in the early 21st century, Harter et al. (2002) added to the literature on engagement. Utilizing the positive psychology structure, Harter et al. (2002) utilized a monstrous store of information (N = 7,939 specialty units) held at the Gallup Organization to study meta-analytic methods on worker engagement inside various fields of industry. Gallup analysts went ahead to characterize engagement as an “individual’s involvement and satisfaction with as well as enthusiasm for work” (Harter et al., 2002, p. 417). Utilizing the Gallup Work Audit (GWA), a well-recognized and organically grown 12-component survey (Buckingham and Coffman, 1999), the outcomes recommended engagement had a positive relationship to essential business results such as for example, consumer loyalty ( $r = .33$ ), turnover ( $r = -.36$ ), wellbeing ( $r = -.32$ ), efficiency ( $r = .20$ ), and benefit ( $r = .17$ ).

Another way to deal with engagement rose up out of a multidimensional point of view of employee engagement. Saks (2006) estimated that engagement was created through a "social exchange model". Saks was the main scholarly scientist to recommend to isolate conditions of engagement: employment engagement and company engagement. In his conceptualization, Saks characterized the rising multidimensional idea of worker engagement as "a distinct and unique construct consisting of cognitive, emotional, and behavioural components . . . associated with individual role performance" (p. 602). This definition was comprehensive of past writing recommending that worker engagement was produced from intellectual (Kahn, 1990; Maslach et al., 2001; Maslow, 1970), emotional (Harter et al., 2002; Kahn, 1990), and behavioural components (Harter et al., 2002; Kahn, 1990; Maslach et al., 2001) and further elaborated the thought on the subject to a 3-component model.

In synopsis, these four methodologies shape the platform for current research in the area of engagement: (a) Kahn's (1990) need fulfilling approach, (b) Maslach et al (2001) burnout-antithesis approach, (c) Harter et al. (2002) fulfilment engagement approach, and (d) Saks's (2006) multi-component approach. Maslach et al. (2001) was by a long shot the most generally referred to approach on engagement in recent times (Christian and Slaughter, 2007). Moreover, albeit every approach proposes an alternate point of view, the shifting approaches stay clear and consistent in conclusion: the advancement of engagement inside companies can possibly essentially affect critical organizational results.

## **2. Literature Review:**

A review of the current literature on the subject of employee engagement was directed through the web databases of EBSCO, Emerald and SAGE Journals. Employee engagement has been examined and implemented in different fields of HR; accordingly this study incorporated the findings from psychological, business and HR literature. This review of literature will focus on the core theories of engagement. This will take into consideration watchful association of the different constructs and will give a recorded point of view of employee engagement and its evolution.

The search process included was most certainly not restricted to the utilization scholarly diary articles that gave the greater part of data on the subject. Also, a Google Scholar alarm was started to produce appropriate current articles identifying with the subject of worker separation.

This exploration study of literature in engagement is based upon Kahn's (1990) unique work investigating the "psychological conditions of engagement". Kahn (1987) at first directed his look into through the hypothetical lens of employee involvement in the job to see how people are psychologically involved in their work. In any case, as with employee engagement, there is no accord inside the writing with respect to what characterizes "job involvement" Saleh and Hosek, 1976). Job Involvement has been considered to be characterized by characteristics of differences in individuals and situational approaches (Kahn, 1987).

Numerous scholars have investigated the subject of engagement and recorded a portion of the key components of this aspect. Shuck (2011) contended that variables, for example, the environment and the individual determine whether a worker is engaged or disengaged. Expanding on prior ideas by Kahn (employee engagement) and Maslow (theory of needs) Shuck recorded three results from the study. To start with, the collaboration between the environment and the individual can make engagement or lead to the opposite effect. Second, bosses assume a crucial part in whether a representative is engaged or disengaged. Third, the personality characteristics additionally has impact in figuring out if engagement or withdrawal will happen.

Robinson (2004) says that the key impacting components of general satisfaction of a worker are job fulfilment, feeling esteemed at work, appropriate communication and learning and advancement and so on. Aside from these central components a few different variables like workplace, culture, advancement, regard and sentiment also influence the engagement level. The model for affecting variables for employee engagement can be shown as under:

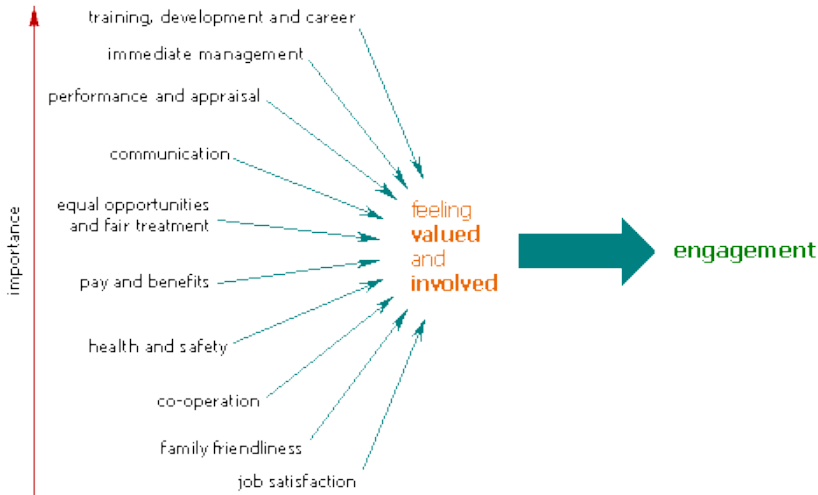


Figure -1: Robinson et al (2004) - Model of Drivers of Employee Engagement

Anitha J (2014) took the points of view from literature and other significant studies, and put together various variables that contributed towards Khan's three psychological states of engagement by and large. Different elements that encourage these three measurements of engagement were distinguished furthermore, were exactly tried and observed to be substantial determinants of worker engagement. These drivers are represented in the figure below:

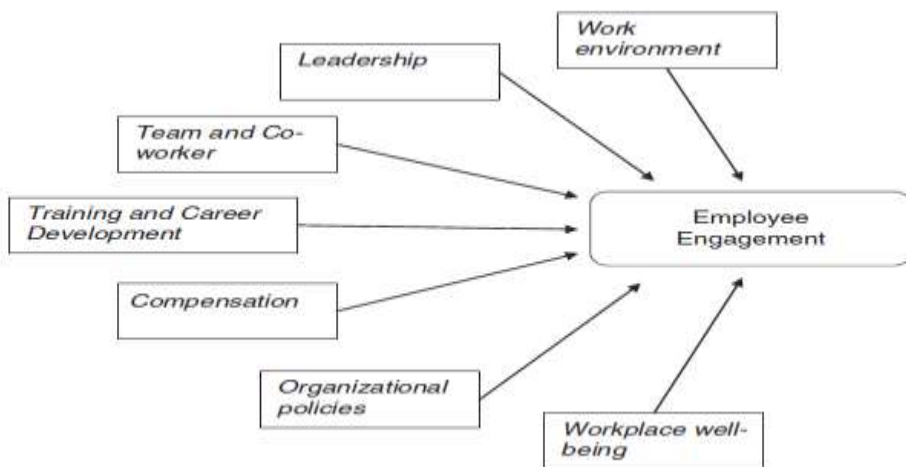


Figure-2: Anitha J (2014) – The determinants of Employee Engagement

The Aon Hewitt (2015, Page 1) engagement model incorporates the drivers and business results of engagement and in addition the individual result—engagement itself. When they discuss the worker engagement framework, they point to the psychological state and behavioral results that prompt better execution. Engagement is thought to incorporate a mix of a many constructs broadly acknowledged in scholastic writing, for example, commitment, motivation and a passion for the organization. Essentially, this implies engagement includes a mix of balanced thought, feelings, aims, and practices required for ideal execution also, efficiency. They operationalize engagement as a framework of six things made out of three recognizable aspects of "say, stay, and strive" with two things each, as represented in the accompanying table.



Figure 3: Drivers of Employee Engagement (Hewitt, 2015)

This "say, stay, and strive" definition was gotten from a huge number of administrative meetings and core interest group exchanges they have led universally with respect to what connected with workers think and do. Their belief is that an employee must display every one of the three features of saying, staying, and striving to be considered "engaged"

Gupta, N. and Sharma, V. (2016) developed a conceptual model on the drivers of engagement based on literature review that investigated the diverse measurements of worker engagement as present in this area that prompted advancement of working model of worker engagement. This engagement model demonstrates the engagement structure, which is focused on employees that are engaged, driven by many components or drivers, to be specific learning and advancement, wellbeing, security, pay and rewards and results in engagements, sorted as organizational results and team member results.



Figure-4: Gupta, N. and Sharma, V. (2016) – Conceptual Model of Employee Engagement

### 3. Digitalization, Engagement and Belongingness:

As the communication environment is evolving, it calls for new methodologies with an accentuation on groups, substance, and exchange as opposed to volume and channels. Open channels for employee voice and cooperation can be altogether enhanced by assessing the effect of web-based social networking. Groysberg and Slind (2012) have shown that a more social oriented way to deal with management may be an essential to bring a change in employee engagement and arrangement in today's networked (likewise through online networking) organization. Martin, Reddington, and Kneafsey (2009) gave cases of web-based social networking corporate applications to key leaders in HR and key stakeholders as a benchmark for more compelling listening to comprehend the voice of the employees and other internal work partners. These incorporated the advancement of the utilization of "employee blogs and online discussion forums" to raise issues that are critical to team members with a specific end goal to surface bonafide worker voice instead of reactions to disposition reviews.

Murphy (2010) investigated this capacity of online networking advancements and communication over networked devices to encourage and energize learning sharing between "silo" employee groups. The cases that were reviewed demonstrated that the synergistic and intuitive qualities of online networking had given companies expanded ability to share data to encourage critical thinking, diminish duplication of efforts, and increment business spryness, and in addition bringing the side advantages of more grounded workforce engagement with senior individuals from the organization, and the advancement of a core competency in attracting new talent. Through online networking, managers can encourage two-way correspondence while workers take part in a bottom up trade of thoughts, and collaborate with partners through web journals and discussion platforms.

By permitting employees to voice their worries and speak with managers, web-based social networking applications can along these lines add to the change of employee engagement. To be sure, Dahl, Lawrence, and Pierce (2011), who considered the expanding utilization of online networking to widen innovation and development both inside and outside the organization, recommended that this provided benefits, for example, enhanced process, expanded client fulfilment, and employee engagement. Doherty (2010) gave practical inputs for HR experts, recommending that online networking provided immense opportunities to build camaraderie among employees. Online networking permit HR to advance communication and the sharing of learning and thoughts and, accordingly, support engagement and at last improve employer brand while at the same time, attracting and retaining the best talent in the market.

The potential advantages of web-based social networking for interaction (and in this way engagement) are along these lines firmly advanced in writing. In any case, these upheld benefits have been thrown into uncertainty by an expanding writing that recommends that accomplishing enhanced connect, coordinated effort, and engagement through online networking won't not be as simple as recommended. Intuitiveness is not simply an issue of finding and sending the right innovation, similarly if not more critical is the need to brace web-based social networking with social thinking.

At the point when utilizing online networking to better connect with employees, supervisors can tend to center on introducing the innovation, as opposed to on outlining a socio-specialized framework that can meet the company's objectives and encourage



genuine conversations. In this way, companies that create an ecosystem that encourage open and genuine interactions will be the ones that can build a competitive advantage for themselves. Taking a more outrageous position, MacCormick et al. (2012) address whether the expansion in the utilization of online networking by means of cell phones could really prompt conditions under which connectivity was tricky for engagement. In any case, MacCormick et al's observational research recommended that the utilization of a Smartphone seemed to enhance work engagement practices, chiefly, however not solely, in useful ways.

Various authors have proposed that the utilization of web-based social networking can just reflect the current structure of "power and politics" inside an organization and won't change interactions in companies in which openness and trust are most certainly not as of now a component of the atmosphere. All the more particularly, Hodgkinson (2007a, 2007b) proposed that companies must ask themselves whether they are really prepared to work together, make, and exploit learning and whether existing social communications are open or shut. Hodgkinson likewise recommends that online networking will mean an unavoidable loss of control in a hierarchical domain, and perceives that the social viewpoints, especially those in regards to chain of importance, power, and legislative issues are altogether different.

Despite the fact that the innovation gives a chance to create a unique identity, he doubts whether organizations have the minimum amount of employees ("critical mass") that can start and hence support collaboration, recommending that not everybody will be ready, or capable, to take an interest — a key determinant in making a really synergistic environment.

Tapscott and Williams (2007, p. 276) additionally perceived that online networking, with its feeling of openness, democratization, and the surrendering of control to the company everywhere, all present difficulties to the set up social and authority standards, soliciting whether the brains from leaders are really ""wired"" for Wikinomics.

Hodgkinson (2007a, 2007b) proposed that the change must be overseen utilizing distinctive methodologies and that by tending to the mental and social parts of interaction (and engagement) organizations could genuinely open the advantages of working as a community and in a coordinated effort. Keeping in mind the end goal to address the more unmistakable social angles, Hodgkinson (2007a, 2007b) proposed that hierarchical leaders expected to give a facilitative and directing environment to secure achievement, recommending leaders must "let go" of their customary tight controls, and work to cultivate collective utilization of web-based social networking platforms.

Online networking tools such as social media are by and large versatile web-empowered device or innovation, which is available through platform free web programs that accentuate social exercises for "collaboration, communications, community and creativity" (Joosten, 2012; Dabbas and Kitsantas, 2012). SMTs empower the sharing of collaborative exercises not just in social but also on instructive and, now progressively, in business settings. It is accepted that through these mutual and arranged exercises, "users will become creators of collaborative knowledge that forms a collective intelligence". Levy (1999) referred to by Nielsen (2010) characterized "collective intelligence" as "a

form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills [... ] No one knows everything, everybody knows something [... ]" (p. 1).

Be that as it may, in spite of cases by specialists, for example, Frand (2000) that drenching in these innovations is complete to the point that youngsters don't significantly consider PCs as "technology" any more. Studies have additionally demonstrated that access to these advancements is not general and that use of mobile technology for learning by youthful individuals at college level is entirely constrained (Bennett et al., 2008; Kvavik et al., 2004; Kennedy et al., 2006) and not really gainful (Hrastinski and Aghaee, 2011).

Confirmation is likewise now rising that there are social contrasts being used of these advances (Kennedy et al., 2010). It would be an error, in any innovation approach usage setting to not perceive the variety in innovation abilities of learners furthermore, staff, and it can't just be accepted all learners are gifted "digital natives" and all scholastics are talented technology clients or that foundations are supporting these patterns.

Organizations and their HR specialists are realising more and more how important it is to improve internal communication with employees. Internal communication can include workers in the organization's aims and is crucial for creating a culture of transparency between management and staff. To communicate with employees, executives use a range of techniques, including face-to-face interactions. The leaders' selected communication tactics are designed to increase employee engagement and trust. As a result, HR leaders discover that their responsibility in promoting employee engagement has expanded.

#### **4. Limitations and Future Directions**

This research has several limitations. Although numerous research articles were examined, only published sources of data were used in the data gathering. As their views span both the management and tactical facets that Kelleher (2001) identified in his research, these publications and journals continue to serve as a good representation of the HR field. Future studies should follow HR specialists over time to learn how internal communications affect employee engagement in various ways and at various times in order to learn how it affects organisational results, including belongingness.

According to Grunig (1993), different audiences can distinguish between symbolic and behavioural communication. He also pointed out that one-way communication is essentially symbolic because it says something without requiring a response. On the other hand, two-way or behavioural communication implies that the provider is ready to have a conversation and really implement changes as a result of that conversation. Executives won't be able to gauge the success of their communication if they are merely planning it and not actually doing it. The effectiveness of involving front-line managers or employees in the development and execution of communication initiatives should be studied in further research.

Future research should think about examining a broader group of executives and workers from a single company to see if that company's employee engagement initiatives are

fostering a culture of trust and open communication between workers and their supervisors. Researchers could track the executives' objectives by speaking to both employees and executives at one company, and then they could follow up with employees to find out the outcome.

Face-to-face communication is one of several strategies used by executives to encourage conversation with their target consumers. However, they acknowledged that their managers aren't always prepared to interact directly with their direct reports. Future studies should assess managers' level of proficiency and confidence in face-to-face communication, including their capacity to listen and offer helpful criticism. Future studies should also look into managers' training in interpersonal communication, as this would help them deliver internal messages more successfully.

Future studies could also look at a company's efforts to increase trust after working with managers to develop their communication abilities. Such a research may assess the organization's degree of trust before managers received skills training and look at how that level of trust improves after managers receive training. Instead than assessing a generic sense of trust and how this affects employee engagement, a future study could examine specific aspects of trust.

Employee engagement is a crucial part of the duties of HR professionals. Employee engagement was defined in the articles included in this analysis as the process of establishing trust with important audiences through communication, which includes both an internal component of belongingness and an outward component of managing their firm's reputation. Future studies should also focus more on the objectives of employee engagement as opposed to engagement for its own sake. The impact that employee engagement has on relationships with other stakeholders, including customers, as well as the levels of trust that engagement achieves, should also be explored in future studies.

## **5. Conclusion**

Employee engagement initiatives that aim to increase employee trust can be advantageous for both the company and the employees. Employees are more empowered to forge relationships with clients on the company's behalf because they feel more involved and have greater faith in their manager and the business. This engagement could be improved with more efficient internal communication.

In order to execute the organization's communication strategies, HR professionals can strengthen their position by providing front-line managers with more effective face-to-face communication abilities. Front-line managers need more training in interpersonal communication if HR executives are relying on them to communicate with employees on behalf of the entire business.

Additionally, Larkin and Larkin (2005) argued that managers should be aware of the channels of communication that are most appropriate for the message. Executives enjoy having a range of channels at their disposal, but in order to learn how employees want to receive particular sorts of communication, they must undertake a communications audit (D'Aprix, 2009). When information is provided in a style and through a channel that the employees prefer, they are more likely to react and participate. Learning to leverage social

media's two-way communication capabilities to listen, monitor, and participate in conversations, monitor social networks, and use analytics to gauge effectiveness will be crucial as social media plays a bigger role in the function of HR professionals (Marketwire, 2012).

According to D'Aprix (2009), organisational leadership has lost confidence because it hasn't been honest with workers about a range of issues that have an effect on the business and its clients. Being transparent and accurate with information that employees and other stakeholders value and paying attention to concerns are two important ways for leaders and organisations to re-establish their credibility and foster a sense of belonging. Effective employee engagement can start to take root after a dialogue has been started.

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# Significance of Emotional Intelligence on Employee Engagement

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## **1. Abstract**

*Employee engagement is characterized by the commitment of employees as a positive, satisfying, business-related perspective that is portrayed by vigour, devoutness, and adaptation to different circumstances. Emotional intelligence refers to the skill to perceive, normalize, and assess emotions. Emotional Intelligence permits us to contemplate more productively and to use our feelings to resolve problems. Emotional Intelligence probably overlaps to some extent with general intelligence. The emotionally intelligent person can be considered capable in four areas: classifying feelings, using sentiments, being empathetic, and controlling emotions. Emotional Intelligence is being termed as smart differently, like possessing the ability to use emotions to support them to choose the moment and have more effective regulation over themselves and their influence on others. Further, there are opportunities for self-development through learning, training and development of emotional intelligence, thereby influencing employee engagement. Organizations and employees must make conscious efforts to enhance employee engagement activities to have an engaged employee for optimizing organisational behaviour and business sustainability. The effect of employee engagement on the performance of employees was evaluated and the findings of the study confirm there is a significant relationship between employee engagement and emotional intelligence, its antecedents and outcomes.*

## **Keywords:**

Emotional intelligence, Employee Engagement, Organizational behaviour, IT / ITES, Service sector.

## **2. Introduction and design of the study**

Emotional Intelligence as a concept substitutes the vast arena of employee effectiveness as it has been established to be a probable strength for work and organizational performance. The construct, Employee Engagement is categorized as the psychological and physical involvement in the organizational processes which are appreciated from a management perspective as well as considered as employee commitment to the organization. The discoveries recommend that emotional intelligence can be developed in individuals and thereby, open new behaviour groups. Employee engagement has been an area of interest from early examinations during the 1920s on pronouncement or a social event's energy to accomplish legitimate objectives. The thought was created by US Army

investigators during World War – II to expect resilience of effort and attitudinal battle – status before a strike. The Gallup Research Group stated that the term employee engagement was developed because of 25 years of talking and obtaining feedback from workers and supervisors (Little and Little, 2006). Along these lines, there are subsequently various perspectives on the beginning of employee engagement yet this may anyway be an impression of the various terms used to depict a construct i.e., employee engagement contrasted with individual commitment. Subsequently came the term and definition of employee engagement, an individual, who is passionate and who pledges by gathering enthusiastic wonders to the organization. We take a closer perspective on lessons erudite through the practices of employee engagement and develop emotional intelligence in Information Technology and Information Technology Enabled Services (IT / ITES).

### **3. Review of Literature**

the ability to monitor one's own and other's feelings and emotions, to discriminate among them

and to use this information to guide one's thinking and actions.

According to Kahn (1990), engagement means to be psychologically as well as physically present when occupying and performing an organisational role. Researchers describe that employee engagement (EE) exists in every person in the organization and is centred around the employee's accomplishment of the business process or objectives. And that the EE goes past something previously conceived as fundamental occupation satisfaction and merges portions of duty, pride and support for the organization's goal and being an organizational brand ambassador. While the onus is on the leaders, who foster relationships by directly communicating sufficiently to involve employees and transform them to connect to the organization, this requires data and analysis from employees also to make the cooperation work better. Goleman's (1995) model incorporates similar empathic mindfulness and amends, this is the ability needed to perceive emotions in others. Knowing these shifting emotional intelligence models the investigation of the relationship of emotional intelligence to moral/moral conduct and values has been conflicting. The good, the morals and the worth measurements are frequently depicted as a feature of the reason for instructive projects including enthusiastic knowledge and all-around planned observational exploration in this space is the need of the hour (Bar-On's, 1997). Researchers say that even though examination recommends that there is an association between passionate awareness and positive execution in the working environment, it is regularly founded on self-revealed appraisal and it disregards that work execution is multi-dimensional. Exploration recommends potential associations between Emotional Intelligence (EI) and positive execution in the workplace. Researchers noticed that task execution may not uncover the culmination of a pioneer's work job. Different practices like keeping up with common connections and assisting subordinates with issues would likewise impact the work execution (Carmeli and Josman, 2006). Utilizing the Trait Emotional Intelligence Questionnaire, scientists estimated that (a) sociologies would score higher than specialized investigations in Emotionality, (b) expressions would score higher than specialized examinations in Emotionality, (c) expressions would score lower than specialized investigations in Self-control, and (d) there would be communication among gender orientation and personnel, whereby female students would score higher than male students inside the sociologies as it were (Sánchez-Ruiz, Jose, Carlos, Prez-Gonzlez and Petride, 2010). Researchers opine that employee engagement is a quantifiable level of an employee's positive or negative passionate connection to their



work, partners and association that significantly impacts their readiness to learn and perform at work. Macey and Schneider (2008) conceptualized commitment at the three-sided level, a complex nomological network incorporating characteristic, state, and conduct builds, just as the work and authoritative conditions that may work with state and social commitment. Albrecht (2010) sees employee engagement as a positive and stimulated business-related persuasive state and an authentic ability to add to work jobs and authoritative achievement. Different scholarly diaries, paper articles, different sites, books, and so on were alluded to extricate the significant examination and to discover the exploration gaps in accessible examination work. Kahn (1990) characterized individual commitment as the bridling of association individuals' selves to their work parts and in commitment, individuals utilize and put themselves out there truly, psychologically and genuinely during job exhibitions. Commitment is described as a feeling of importance, eagerness, motivation, pride, and challenge. Retention is described as being completely focused and joyfully charmed in one's work, whereby time elapses rapidly and one experiences issues with disconnecting oneself from work. Robinson et al. (2004) consider employee engagement as an uplifting outlook held by the worker towards the association and its qualities. Schmidt (2004) characterizes commitment as uniting fulfilment and responsibility. Shaw (2005) likewise made the meaning of representative commitment, which is, interpreting worker potential into representative execution and business achievement and along these lines that changing how workers perform by using the devices in the arsenal of inward correspondence experts. Saks (2006) depicted commitment as a mental presence with two key components, consideration and assimilation. Consideration is the intellectual capacity and the measure of time one spends contemplating a job and retention is being fascinated by a job and alludes to the power of one's emphasis on a job.

#### **4. Research gaps**

There is a need to explore the significance of emotional intelligence and its influence on employee engagement during the COVID-19 pandemic in service sector industries like IT / ITES. The accompanying segment looks at important writing around the work done on employee engagement and emotional intelligence in the past and investigated the conditions at work in which individuals join in and separate from the organization. To accomplish the unmet need and to bridge this gap, this research paper aims to assess the significance of Emotional Intelligence on Employee Engagement thus improving the retention of employees. In line with the assessment as suggested in the literature, the study framed the research hypotheses and perused further.

#### **5. Research design/ methodology**

Emotional intelligence influences employee engagement and is closely associated with each other. Based on this, the questionnaire was prepared for this study and distributed to 400 IT/ ITES sector employees in Bengaluru in India. The parameters as well as the questions conversed with specialists in the arena of HR. The questionnaires were then self-administered and then a brief conversation was held with them after accomplishment to find out if any complications or misperception ascended with completing the questionnaire. A 5-point Likert scale was used to measure the responses of the respondents. Collis and Hussey (2003) mentioned that validity is the degree of research findings precisely represented in the given situation. Leedy (1997) described that data

validity is the correctness with which a tool measures the aspects or situations in a research study. Cronbach's alpha coefficient was used to measure the reliability of the questionnaire. Cronbach's (alpha) is a coefficient of internal consistency. It is normally used as an evaluation of the reliability of a psychometric test for a trial of subjects. A generally recognized rule for relating internal uniformity using Cronbach's alpha is that value higher than 0.7 is acceptable i.e., the questionnaire is reliable and may be lessened to 0.6 in the investigative study (Hair, Anderson, Tatham and Black, 1998).

**Table 1. Cronbach's alpha coefficient**

Variables	Cronbach's alpha
Emotional intelligence	0.726
Employee engagement	0.774

**Table 2. Demography of the respondents**

Gender/ Marital status	Male	Female		Married	Unmarried
N = 400	212 (53%)	188 (47%)		152 (38%)	248 (62%)
Age	<25 years	26-30 years	31-35 years	36-40 years	41-45 years
N = 400	80 (20%)	96 (24%)	144 (36%)	68 (17%)	12 (3%)
Service years	<1 year	1-5 years	6-10 years	11-15 years	>15 years
N = 400	32 (8%)	184 (46%)	80 (20%)	56 (14%)	48 (12%)

**Table 3. Employee's experiences on employee engagement**

N = 400	Emotional intelligence	Employee engagement
Mean	3.8850	3.7751
Std. Dev	0.6212	0.5365

**Table 4. Correlation analysis of factors of employee engagement**

Correlation Analysis	N=400	
Variables		Employee engagement
Employee engagement	Pearson Correlation	1
	Sig. (2-tailed)	-
Emotional intelligence	Pearson Correlation	0.7245*
	Sig. (2-tailed)	.0442

\*Correlation is significant at the .05 level (2-tailed).

## 6. Analysis and discussions

The information gathered has been investigated in this segment, and introduced the results of this particular examination. The information uncovered that a bigger populace of respondents is male (53%). It is seen that the vast majority of the respondents (36%) are 31-35 years old population, with 26-30 years being the following next majority of respondent's age (Table 2). The mean upsides of the predecessors demonstrate that organization practices and development openings arose to be the main forerunners of emotional intelligence and employee engagement with a mean of emotional intelligence of 3.8850 and employee engagement of 3.7751 (Table 3). In the survey, the respondents were needed to address questions identifying with the predecessors of emotional intelligence and employee engagement. The aftereffects of this part are summed up (Table 3) which is gotten from the survey with a five-point Likert-type scale with the accompanying classifications: 1 = Strongly concur, 2 = Agree, 3 = Neither concur nor dissent, 4 = Disagree, 5 = Strongly Disagree. Table 3 contains the descriptive statistics with mean and standard deviation. The essential measurement for the investigation and understanding is the mean. The investigation was performed utilizing SPSS statistical programming. To assess the association, Pearson correlation and to test the significance, a 2-tail test was utilized. The examination and understanding of co-connection insights are as per the following. Table 4 shows the consequences of expressive measurements determined utilizing SPSS programming. The connections between emotional intelligence and employee engagement, the variables impacting commitment, and what's more, the results of commitment were theorized. Co-connection coefficients were determined for precursors and results with a level of commitment utilizing SPSS programming. To test the above objectives and the hypotheses, Pearson correlation statistical analysis was used to analyse the association between the independent variables and the dependent variable. An Independent t-test was performed to determine the significance between the variables. Correlation coefficient investigation infers that there exists a linear association between two variables (Bewick et al. 2003). It is a measure of strong correlation when the values of the coefficient lie between  $\pm 0.50$  and  $\pm 1$ . In this way, it can be interpreted that worker retention, worker performance, worker productivity and manager's satisfaction are positively connected with employee engagement. The lower p-upsides of ( $<.05$ ) for each factor (Table 4) demonstrate that there is a critical connection between employee engagement and its results viz., worker performance and worker productivity. Subsequently, it is inferred that there is a strong relationship between emotional intelligence and employee engagement at a 95% confidential level.

## 6. Limitations and future scope

This study focused on the IT / ITES sector in Bengaluru during pandemic times and can be further evaluated to assess the impact of the pandemic on other sectors. Also, note that only the need for emotional intelligence on employee engagement has been considered for this study and there is a scope to evaluate the other antecedents influencing employee engagement like spiritual quotient, social quotient, etc. This study can be conducted on a larger population including other regions of India.

## 7. Conclusion and recommendations

Emotional intelligence assumes a significant part in employees in the organization. This paper has made a larger comprehension of the different purposes behind the feeling and better command of feeling. Dealing with feelings is a significant necessity for a human asset division for themselves and among the employees too. In responsibility, an organisation's people lead themselves in powerful, complete their assigned work shows the individual driving energy like physical, mental and eagerness to work. Engaged employees are portrayed as being intellectually present, totally there, careful, feeling related, consolidated, and focused in their work presentations. These are accessible to themselves just as others, related to work, and focused on their work execution. A survey of the literature showed that employee engagement has been conceptualized unexpectedly. It got strong from the literature that employee engagement is characterized distinctively by different associations and writers. These definitions are as a rule adjusted to what the organizations consider significant for them. The vast majority of the writing utilizes a multidimensional way to deal with characterizing employee commitment, where the definition embodies a few components needed to accomplish employee engagement. The investigation demonstrated that a decent degree of commitment may prompt employee engagement, yet just for a restricted time frame in the IT / ITES arena. The requirement for a more thorough employee engagement build is demonstrated by the investigation. The examination uncovered work-life balance, job content, monitory-advantages and team direction as normal drivers of employee engagement. Michael Shuck (2010) analysed the connection among work fit, responsibility and mental environment, optional endeavours, goal to turnover and employee engagement. The consequences of the investigation uncovered that work fit, full of feeling responsibility and mental environment were all essentially identified with both optional exertion and goal to turnover. Representatives who detailed encountering a decidedly mental environment were almost certain to report significant degrees of optional exertion. A composed feeling of responsibility and employee engagement is anticipated at junior levels of employee and their intention to contribute to the organization's revenue. Rama Joshi and J.S Joshi (2011) investigated the hierarchical environment and its job in driving employee commitment in an assortment of Indian Organizations. Degree for headway and top administration worker relations were the extra key drivers of commitment for chiefs. Jyotsna Bhatnagar (2007) examined the ability of the board and its relationship to levels of employee engagement utilizing a blended technique research plan. In the primary stage, low factor loadings showed low commitment scores toward the start of the vocation and at the finishing of 16 months with the organization. High factor loadings at middle phases of work were characteristic of high commitment levels, yet the meeting information mirrored that this may mean high dependability, however just for a restricted time frame. In the subsequent stage, factor loadings demonstrated three particular variables of authoritative culture, vocation arranging alongside impetuses and hierarchical help. The first two were characteristic of high wearing down. Priya Shanmugam and R. Krishnaveni (2012) inferred that there is a solid connection between employee commitment and authoritative execution. Organizations around the globe are estimating their employee' degree of engagement in the endeavour of improving efficiency, productivity, turnover and well-being. An unmistakable and succinct meaning of employee engagement can give human asset advancement experts and workers integral assets to foster working environment systems that can significantly improve worker fulfilment, satisfaction, unwaveringness and thus employee engagement. The workplace ought to be better so the employees can have a superior collaboration, discover answers to the issue, upgraded work obligations,

bunch missions, accept challenges, do routine work, and fearlessness among employees. Emotional intelligence will acquire better flexibility, sympathy towards representatives, initiative characteristics, bunch compatibility, participative administration, dynamic, and comprehension among associates. From our current research, it can be understood that worker retention, worker performance, worker productivity and manager's satisfaction are positively connected with employee engagement. Further, it is inferred that there is a strong relationship between emotional intelligence and employee engagement at a 95% confidential level. The extension for proceeded research on emotional intelligence and employee engagement is immense towards further understanding organisational growth and sustainability.

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# Effects on Transformational Leadership of HRM professionals in food industry

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## **Abstract :**

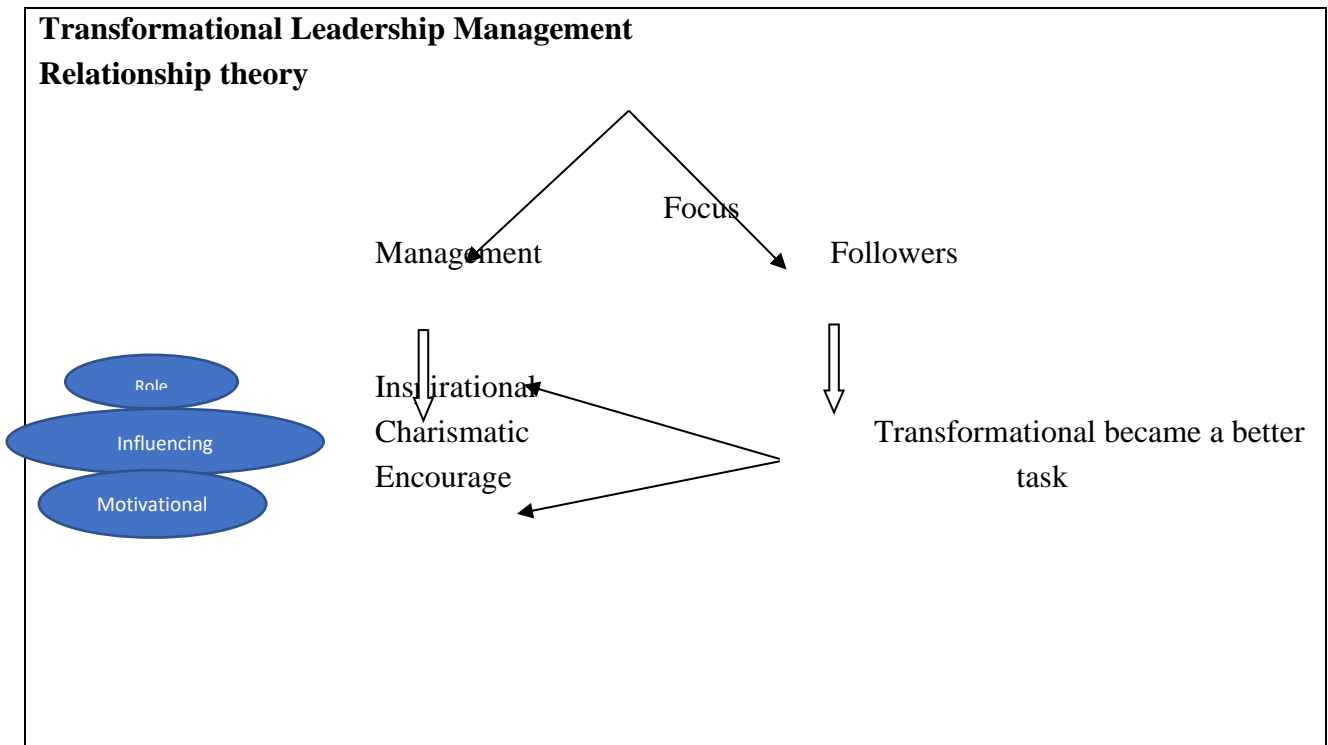
**Purpose-** *This paper examines the beliefs of HR Professionals regarding the impact of Transformational leadership is widely recognized as one of the most significant kinds of leadership for changing organizational and individual outcomes in order to obtain a competitive advantage. Among the most crucial positions in any firm is leadership. This study investigates how various leadership styles effect employee innovation in the FMCG industry in India. While both styles of leadership have a good association with Human resources management, leadership has a considerably favourable relationship with worker performance. It has been argued that the Indian FMCG industry might develop more successful leaders if it focused on Style Of leadership in training sessions and other guides. Worker innovation have a significant impact on organisational effectiveness. According to the findings, managers' and supervisor' leadership styles innovation have a positive impact on business success in the dairy food industry. The difficulty makes a "speciality" of how personnel go through because of the rareness of right education in robotics and digitalization with inside the food industry sector.*

**Keywords:** - Employee training, Innovations, leadership, Transformational, talent, Hr professionals.

## **Introduction:**

Transformational leadership management theory means best change for leaders and followers. This theory is called "Relationship Theory". It is represented by management ad workers in between relationship focus only in TLM theory. How the management it could be encourage by the workers.

**"The ability to get people to want to change and to lead change."**



**James MacGregor Burn’s transformational theory:**

❖ **This theory developed by MacGregor James Burns 1978.**

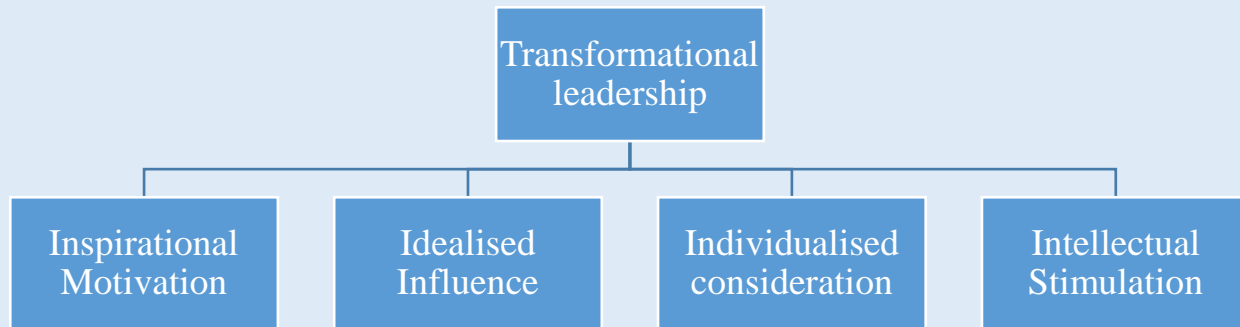
James MacGregor Burn’s defined transformational leadership as a process in which leaders and followers participate in a reciprocal process of learning **‘raising one another to higher level of morality and employee motivation**. Transformation leaders raise the bar by appealing to followers' higher ideals and beliefs. While doing so, people may act as role models for the values and employ charismatic tactics to draw others to the ideals and the elderly leaders. Using **social and spiritual values** as a motivational leader is very powerful as they are both hard to deny.

**Overlapping meanings:-**

- Leader’s magically qualities.
- An emotional bond between the leaders and the led.
- Dependence on powerful figures by the masses.
- Assumption that a leader is omniscient and virtuous.
- Popular support for their leaders that verges on love.



## Transformational Leadership Management



(Source:- This model taken from: The Effect of Transformational Leadership on Organizational Performance. Link to this article: <https://doi.org/10.37134/ibej.vol13.sp.7.2020>)

### **Food industry:**

Food is a human basic need to survey everyone. Based on the Population growing every day in the world. The food industry needs to fulfil the requirements within the help of the modern technology to delivered produce to the product to the consumers, this industry helping the country economically self-sufficiency to achieve demand in market. Food industry contributing more creating a new product and adding new technology to delivering a market in a correct time. India is having highest agricultural farming outputs. Indian growth of food industry leading in overall developing in current trends.

### **Important of training in the food processing industry:**

Food business operations Management and HR professionals will undergo given the training to every employee to providing a safe and hygienic good quality food product processing. Training aspects in employee working space should be safety to all operational activities without having any risk to take next stage of the processing.

### **HR Professionals Role in industry:**

Between high role training the employees in proper fields and how they want to be hygienic before entering the processing unit, workers are should take care of our working area. Platforms providing the storages of wastage and removal from the establishment wall should be waterproof and non-non-toxic materials and lighting should be bright. Some places we need to maintain the temperature depends upon the food products. Example cold and frozen handling the employees.

### **Hygienic requirements**

In Dairy food industry, building rooms, equipment's and physical more movable and non-movable units. Draining should be more maintained in good condition and daily needs to be cleaned. Every person who all visit in the particular area or any food consuming unit they should be a clean productivity clues and head cover. Just need safety shoes, face masks and etcetera. These are very important to give training to the employee's role in HR. Training which are area need to follow the procedure they are monitoring. In case any implementation require that should be considered employee health. To be ensured because cold processing industries below 20<sup>0</sup>C temperature flows. For example, frozen vegetables and meat industries. We need to monitor every day in that area employee health, safety, safe conditions. Alright and snacks indices, huge height technologies in working processing areas, HR providing awareness for fire safety precautions training in all the above the industries equipment's. Safety to be ensured in all the trainings we provide to ensure the important safety input processing industries.

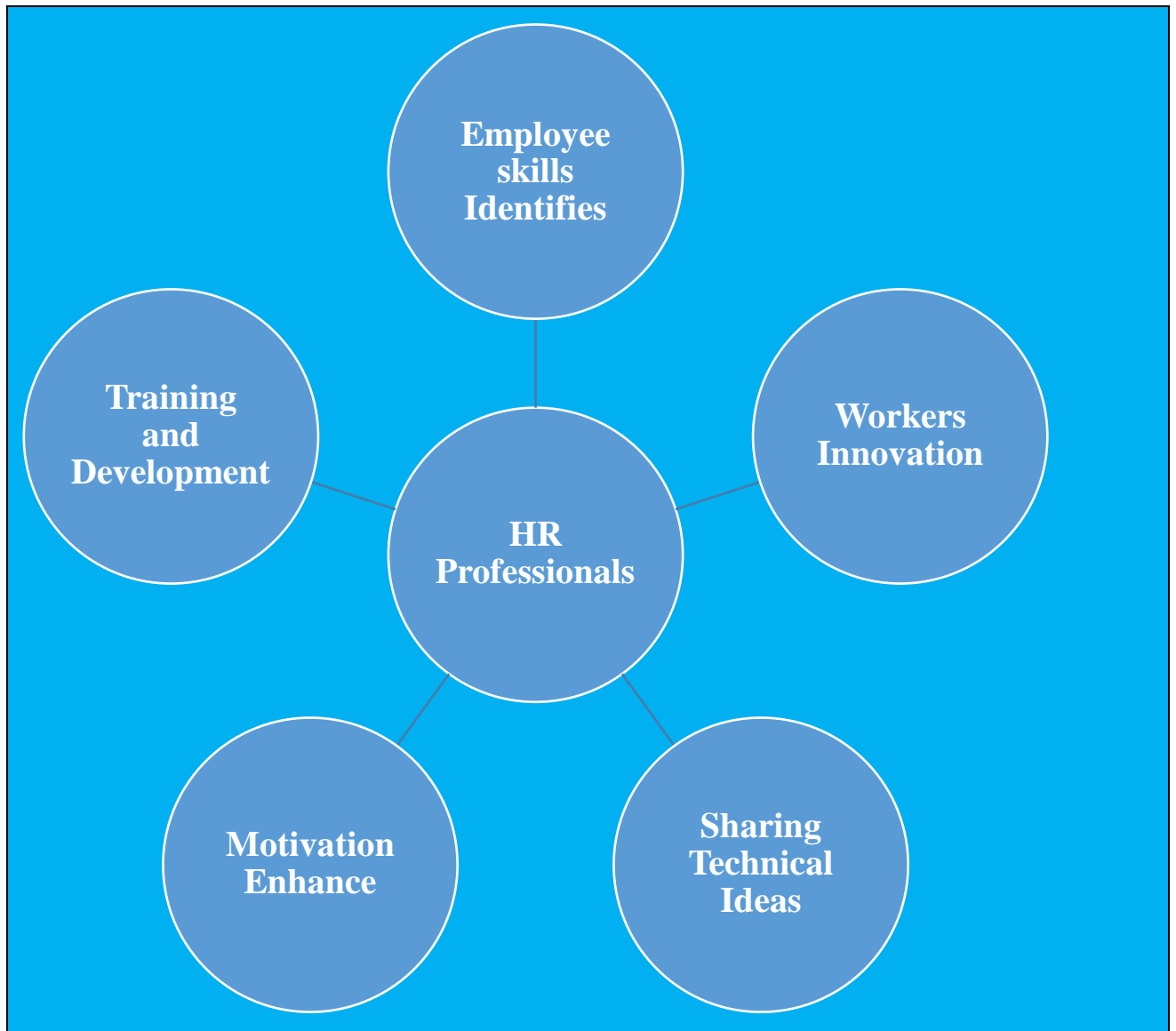
### **HR Professionals Innovation in Dairy industry**

- Advances and Innovations inside the Indian Food Industry

Despite recent troubles in the dairy industry, there is a growing taste for and need for dairy foods. Dairy and milk products are becoming increasingly common, thanks to a growing middle and upper classes with more disposable means, consumers looking for healthy foods to fit into a healthier lifestyle, and an emphasis on organic products. India, being just the world's largest exporter of milk, is a crucial stakeholder in the dairy sector, with tremendous potential for development. However, the Indian dairy sector suffers disorganization challenges, with just 18 to 20% of total milk produced flowing via the proper organized channels. Dairy, among the quickest developing refreshment in India, is forecast to become a trillion dollars industry by 2021, led by the three core groups of dairy foods, chai and lassi, and healthy yogurt beverages. Despite organisational challenges in the dairy industry, the union cabinet 2018-19 included a particular emphasis here on countryside sector as a way to assist in the improvement of logistics management and the adoption of new technologies.

In recent times, the Indian dairy sector has seen considerable technology improvements, along with a deep learning management system built by start-up. Moo Farm to address mastitis, a condition of the cow breast that costs the country around half a billion dollars each year.

**Figure 1: Structure Framework**



**Methodology:**

This study covered to estimate the impacts of HR professionals s innovation in dairy industry. The approval of these organisations' Human resource (HR) management was secured in order to gather data. Data was collected using quantitative questionnaires given 65 workers get from 50 workers was collected and simple sampling data in dairy industries. We adapted one variable itself and construct also chosen. A well-structured survey was designed to collect data on four factors: (Highly satisfied, satisfied, Highly Dissatisfied, Dissatisfied and use of technology in the workplace, as well as employee performance and employee innovativeness). approximately 30 of their workers during regular hours of work. Gender, age, educational qualification, and designation were also part of the questionnaire to collect personal details but they were not utilised in normality test.

**DATA ANALYSIS AND INTERPRETAION:**

**Inference:**

In this paper and absovered taken in friendly infrared maximum age observed highest number of response who are belongs to 31-40 age people. At the same time least number of response 41- 50 above age categories fall under the analysis.

Table 1 Demographic characteristics of the respondents

Sl.No.	Constructions	Items	Frequency	Percentage %
	Gender	Male	26	52
		female	24	48
1	Age	Up to 30	13	26
		31-40	27	54
		41-50	5	10
		Above 50	5	10
2.	Marital status	Married	40	80
		Unmarried	10	20
3	Family type	Nuclear		66
		Joint		34
4	Designation	Employee	17	34
		Asst Manager	17	34
		Manager	13	26
		Head of the department	3	6
5	Position	Operating level	6	6
		Middle level	27	54
		Senior level	17	34
6	Educational Qualification	School	2	4
		Diploma/IT	9	18
		Degree	20	40
		Post-graduation	19	38
7	Experience in the organization	Up to 5yrs	12	24
		6-10yrs	15	30
		11-15yrs	9	18
		Above 15yrs	14	28
8	salary per month	Up to 15000	8	16
		16000-20000	6	12
		21000-36000	17	34
		Above	21	42
9	No.of Training program attend	Up to 3	15	30
		4-6	11	22
		7-10	11	22

		Above 15	14	14
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**Interpretation Analysis:**

Among the Categorical variables, found the respondents are from 18 to 40 age group of people. The majority of the respondents are married and also belong to nuclear family type. Most of the respondents fall on middle level management position like Assistance managers and other executives. Since number of respondents who are having 10 to 15 years, more than of experience are getting highest value. In terms of organizations smatter, employees are found satisfied in their self-rostering, problem solving methods, team working, free flow of information and openness in communication, flexible employment through job rotation and involvement in originations decision in their workplace. It is found that determining are in the dilemma. The division of work or observed on neither satisfied or dissatisfied employees.

In terms of working flexible, labour contracts, opportunities to employees for telecommunicating, flexible manufacturing system, work from home and workplace teleconferencing. It is found that determining are in the dilemma. The division of opportunities for flexible working times/schemes or observed on neither satisfied or dissatisfied working flexible employees. In terms of Strategic Orientation, employee encourage innovation, promptly detect shifts, major competitors existing customers, obtaining information about customer need. The division of “major competitors, more emphasis on customers of the future, as opposed to existing customers” or observed on neither satisfied or dissatisfied orientation.

In terms of Technology application, improve design of information system, workplace collaborative and technology to deliver the service to client instantly willing to adapted the technology. The main problem workplace processes are managed and automate by ERP or neither satisfied or dissatisfied. It observed people are neither fresher not retainment age those who are certain reasonable experience who are experience who are respondent the questionnaires. In age group as we are not coming under the maximum response not fall on than 36000 and above and its being belong to 26000 – 36000 of second category. I absolved may be in the age category 31-40 who have just expressive were will response in this questionnaire. And also married people response highly in highest number. And also, that married people offend face to answer this analysis.

Mostly self-rostering, problem solving, division of work, team working, communication and employee job rotation highly response is 58% remaining is 42 % response is other category. In working flexible: time/scheme is 44%, labour contract is 60%, telecommunicating (70%), manufacturing system (60%), work from home (48), flexible working days and hours (56%) and teleconferencing (46%) are response other are response some categories. Strategic orientation: Creativity (52%), detect shifts (46%), major competitors (48%), new markets (62%) and current need(70%) are responded maximum categories.

**Literature Review:**

Analysing the effectiveness of HRM practices in FMCG industry. **Dr. Veena Rani. K And Dr. Gaythri Reddy. K (2022).** HRM strategies have an impact on employee in the FMCG business. Because this business is continuously evolving, more HRM practises are required for employees, which will aid in enhancing employee productivity.

Settings the conditions for open innovation in the food industry: Unravelling the human dimension of open innovation: **Rocco Palumbo and Mohammad Fakhur Manesh (2021)**. Implementation of employee innovation and training in industry. Human resource experience affects employee skills, goals and interpersonal relationships. Employee engagement and perception of an open business environment in food industry.

Does leadership style affect organizational effectiveness? A study on food processing industry in Odisha-India. **Bandana NAYAK and Chandra Madhab MOHAPATRA (2018)**. The styles of leadership of Supervisors and managers have a significant effect on employees in the food processing sector. Covers the link among leadership and organizational success, emphasizing theoretical and empirical research on the topic.

Recent trend in the dairy industry. **Young W Park and Georgia Small Ruminant. (2018)**. Also, dairy manufacturing organizations have used a number of modern technologies at record levels to improve decision-making in the creation of their goods by utilizing current technology and digital technology.

### **Conclusion and suggestions:**

This article studied the human aspect of food firms' open process innovation, even though that HRM were not found to boost individuals' willingness to engage in knowledge creation directly. Worker inventions in industry channelled the positive benefits of HRM. Before successfully implementing performance and staff proactivity strategies. The effective of leadership in organizations must know it. The most favourable in dairy industry workers training department to employee given is that session itself. As a result, the most important step for employers might be to establish and maintain a supportive and constructive corporate culture for workplace innovation.

### **Findings:**

The present study looked into knowing the real gap between staff capability and lacks of talents in dairy industry. In new modern technology employee need to aware how to developed works skills and talent to prove the management. Employee innovativeness is directly correlated to the use of technology in the workplace. Employees only become more upset when the organisation takes an appropriate reaction.

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16. **Young W Park and Georgia Small Ruminant. (2018)**. Recent trend in the dairy industry. Also, dairy manufacturing organizations have used a number of modern technologies at record levels to improve decision-making in the creation of their goods by utilizing current technology and digital technology.

## The relationship between Transformational Leadership and Organizational Performance: Exploring the Mediating Effect of Organizational changes.

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### **Abstract**

*Every human being cherishes certain dreams and aspirations in his/her life. Transformational leadership influences people in a positive sense. And they are the leaders who can draw the people to a creative world. Hence, they can attain form the people to the desired goal at the right time. When we compare the other leadership style, we can very well say that this kind of leadership usually generates higher performance, because it influences the core of the individual. It is not only the knowledge of the firm members alone but also the presence of good leadership that improves the performance of the firm. It makes them more creative and innovative than before. A leader's perception of the strategic variables is crucial for better performance in the organization. The research methodology was partly descriptive and partly exploratory. The data for the study was collected from both primary and secondary sources. Statistical tools like correlation, coefficient, chi-square test, and ANOVA test were used to analyse and interpret the primary data. The study reveals that there is a significant relationship between transformational leadership and organisational performance at the time of transition especially at era of technological changes. Transformational Leadership influences, inspires, and motivates the followers to adapt the changes that occur in the organization.*

**Keywords:** Transformational Leadership, Organizational Changes, Digitalization, Efficiency, Effectiveness



## **Introduction**

Every human being cherishes certain dreams and aspirations in his/her life. But often these dreams and aspirations do not get realized either due to certain problems of life or nothing to substantiate them. To realize one's dreams and aspirations, one should be ready to make certain sacrifices in life as well as adopt some practical steps and actions. Therefore, organizations need to adapt certain kinds of changes that occur in the environment of the organization. They need to understand the changes that occur in and around, accept study, adopt, and implement them in the organization for its sustainability and success. Naturally, there may arise a question, who will take the initiative to bring these changes to the organization? At this juncture, leadership plays an important role. One needs to recognize the importance and role of these changes, and how far they can help the organization for its sustainable and successful existence. Many researchers agree upon the transformational leadership style to be brought into the organization.

In today's technological society the management of knowledge and innovative ideas are the key processes that enable us to create, exploit, renew and apply knowledge, to have an improvement in organizational performance. In today's world, cited around true knowledge and people want to have proper knowledge regarding the matters around them and at the same time, they can give and should be able to mold them in and around true knowledge. Organizational knowledge is not only based on inner knowledge but also, they have to draw knowledge from outside, to maintain the organization with good leaders, who can gather fresh ideas and need to share them for further growth among them and for others.

## **Statement of the Problem**

To meet the demands and challenges of a competitive and ever-changing business environment, organizations need to consider the dynamism of innovative and visionary leaders, who can motivate and encourage their followers towards an effective teamwork and team interaction even amid organizational changes.

Although changes do take place in the organizational environment, very often organizations fail to capitalize on these changes due to various factors. Lack of motivation, indifference, and non-cooperation by the employees hinder the process of transition to new technology, knowledge, and skill. These changes need to be enforced by proper motivation and job enrichment potential. Therefore, the role of innovative and transformational leaders is a very crucial factor for an organization for ensuring effective teamwork and interaction, motivating and inspiring the employees to bring in the needed behavioral and attitudinal changes in them so that they can accept and adopt the changes in technology, knowledge, and skill, which in turn may result in greater organizational performance, in terms of sustainable growth and development.

Therefore, this study addresses the problem: "How can the leaders effectively bring about organizational changes without negatively affecting the team spirit, motivation, and interaction of the employees?" It proposes ways and means so that transformational leadership can motivate and inspire followers even amid organizational changes without affecting the effectiveness of teamwork and interactions.

## **Research Questions**

1. How does visionary leadership with innovative approaches relate to successful organizational changes?

2. How does transformational leadership impact accept organizational changes?
3. What are the factors which impact the employees' thinking patterns to bring change into the organization?

### **Objectives**

The following objectives are formulated with the help of a literature review and the research gap identified. This study is intended to verify the following objectives;

- To analyze the role of transformational leadership in organizational change.
- To identify the relationship of the transformational leaders to the organizational performance
- To study the effect of transformational leadership on organizational performance at the time of organizational changes.

### **Hypotheses**

**H<sub>A1</sub>:** Transformational leadership is positively associated with organizational changes.

**H<sub>A2</sub>:** Transformational leadership is closely related to organizational performance and change.

**H<sub>A3</sub>:** Transformational leadership has a significant role in the organizational performance and employee growth.

### **Literature Review**

(**Awamleh, R. et al H. 2004**). The study found that the transformational leadership style can boost the performance of the employee level through motivation and inspiration. And also, they found that only in high conditions transactional leadership has a positive impact on the performance of the employees and job satisfaction. Both have only relations based on satisfaction, not on the performance level. Transformational and transactional leadership is not mutually exclusive but partially complementary in some settings.

(**Hahn, F. et. 2014**). 3D printing is a term to describe a tangible product that is controlled digitally. Through the introduction of this technology, there is a paradigm shift from tradition to the new production method. The study points out the disruptiveness of different types of methods which were existing. The study agrees upon these kinds of innovations bring new kinds of opportunities to the organization and especially to the starts up.

(**Choi, S., et al 2016**). This study was trying to understand nurses in Malaysia and to know the relationship between the transformational leadership style on job satisfaction and empowerment. The study could find that transformational leadership can improve culture, intelligence, and rational thinking. And the study also says that if the leader can empower their employees, then it will be more productive for the organization.

(**Al-Quraan, A. 2016**). The present, global employee commitment is a challenging factor that the organization faces today. The study found that transformational leadership and commitment have positive significance to work in the organization. Hence, the author could find that transformational leadership has more energy and power to motivate and inspire employees in the future to attain long-term vision and goals. Personal attention is given, especially to their needs and demands, and be able to get their full commitment and loyalty to the organization.

(**Al-Harthy, F. et al 2016**). Employee performance is one of the important factors which

measure the performance of the organization. The performance of an employee is related to their skills and development at work. He could find there is a relationship between training and employee job performance too. This employee training will be able to boost their performance; thus, it leads to more creativity and productivity in the organization.

**(Jyoti. J., et al 2015).** Globalization paved the way for changes and innovations in the organizational environment. The results of the study indicate that transformational leaders have a significant relationship with their followers through their behaviour towards the followers. Since they show individual concern, the followers are willing to accept them as role models, and, as a result, we can see the growth of performance levels there.

**(Sharma. I., et al 2013).** At present, the organization faces a lot of trials and several tests. To withstand all these, the organization has to undergo certain changes. Adaptation of these so-called changes will modify the organization's performance effectiveness and efficiency of the employee and the organization. The study found that the transformational leadership style brings an effective change in organizational management. The organizational change should be brought into the organization well-planned. The performance level of the employee and their satisfaction is also mutually related to each other.

**(Teymournejad. K., et al 2017).** The most dangerous situation that an organization faces today is the change of dynamism. Today the organization needs to develop a leadership style that can compete with the other organization with new technology, skills, developments, and adaption to the change that occurs. Through cooperation and understanding, we can notice the improvement in performance level, work-life balance, satisfaction level, and increase in profitability too. The transformational leadership style provides a platform for the employees to open up their new ideas, and creativity and explore new areas of the organizational environment, and also provides new opportunities for organizational learning.

**(Aminbeidokhti, A. et al 2016).** Organizational innovation is always considered a powerful weapon for sustainable development in the organization. The world and organizations are under change and seeking a better and best technology for maximum production. Innovation can be divided into two parts, administrative and technological innovation. These are the two areas that make a competitive edge for the organization. They are the people who convince the employees to take risky decisions.

**(Sundi. K. 2013).** The term leadership indicates the ability to convince and motivate others to work as a team and achieve its greater goals. They teach the followers the importance of work, values, discipline, etc. in their life to keep the balance between them. As a result, it improves the trust and respect of the followers for their leader. True leaders are people who try to instigate courage and confidence to take up more responsibility within the organization. Hence, it creates the follower's motivation and enthusiasm to accept any kind of responsibility and perform in the best way possible.

**(Ahmad. F., et al 2014).** The measurement of effective leaders is realized through the performance of the employee and the way he motivates the employees to attain the prescribed goal of the organization. In the organization, employee motivation is one of the most important factors which brings and shapes the organization, hence leading to the profitability of the firm. The study highly recommends that there should be someone who can motivate and give value to the employees because they are the people who work in the organization with their behaviour and attitudes.

**(Steinmann. B., et al 2018).** The authors point out through this study that transformational leaders motivate the employees to enhance the goals of the organization to achieve them at the right time and in the right place. The authors try to understand the relationship

between transformational leadership and Job Attitude as well as proactive behaviour towards the achievement of the organizational goal. The analysis found that it is linked between them. The study further found that goal attainability in the organization gives the followers with job satisfaction and proactive behaviour.

**(Uddin. M. (2013).** The positive attitude of the leader very well affects his or her followers. This will generate trust, commitment, loyalty, and faith in their relationship. The study realizes that trust plays a mediating role in the organization for any changes or growth. Hence the study tells us that a true leader needs to attain the trust of their followers to cope with the changing environment in the organization. It mediates as an inspiration for employees to be more creative, innovative, and productive in the organization.

**(Strukan. E., et al 2017).** Leadership has a positive impact on many-core factors of the organization. The well-being of the organization is directly or indirectly related to a good leadership style. To make fruitful changes in the organization, the creator should have tremendous spiritual power. To begin changes in the organization, the leader should have certain qualities like skills, be a strong role model, moral values, commitment, competence, vision, and motivate others. Hence, they can cooperate and encourage followers to reach the prescribed goals of the organization.

**(Jyoti. J., et al (2015).** The research could find that there is a significant positive relationship between transformational leadership and employee creativity and organizational learning stands as a mediating role in this relationship. True leaders are those people who encourage, motivate, and provide freedom for creativity and also for organizational learning. The leader stands as a medium for the followers to attain the necessary skills for the development of the organization and individual growth too.

## **Research Gap**

Human resource management has gained momentum in recent years and has new paradigms of transformational leadership in human resource management studies. Studies related to transformational leadership indicate that the behavior and attitude of a leader highly influence the followers. Transformational leadership is the ability of the leaders to influence, inspire, and motivate their followers in any given scenario. Existing literature on transformational leadership lacks focus on teamwork at the time of the organizational changes.

## **Methodology**

The research focuses on studying the relationship between transformational leadership and organizational performance and further the exploration of mediation by the organizational changes for enabling transformational leadership for the successful performance of employees. The methodology is a way and approach by the researcher for collecting the data. This research is primarily qualitative. The research is based on primary data. The well-formulated questionnaire will be circulated to collect the data along with the interview method. The interview aims to make this thesis more systematic.

## **Research Design**

Research design is the specification of methods and ways for gaining the needed information. The design to be adopted here is exploratory research. Here the need is to extract the information about transformational leadership which leads to the effectiveness of teamwork and their interaction during the time of organizational changes.

### Discussion and Analysis

Purpose of this study was an attempt to identify the Relationship between transformational leadership and organizational performance at time of change. In order to identify this relationship made use of analysis like correlation, Anova, coefficient and chi-square. Following are the result of the analysis,

### Correlations

		Transformational Leadership	Organisational Changes
Transformational Leadership	Pearson Correlation	1	.549**
	Sig. (2-tailed)		.000
	N	64	64
Organisational Changes	Pearson Correlation	.549**	1
	Sig. (2-tailed)	.000	
	N	64	64

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

The above table shows that Karl Pearson correlation coefficient is .549, which implies that there is a moderate positive correlation between transformational leadership and organisational changes.

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.696 <sup>a</sup>	.484	.467	1.47381	.484	28.645	2	61	.000

a. Predictors: (Constant), Organizational Performance, Organisational Changes

The R and R<sup>2</sup> values can be obtained from the above Model Summary Table. It is clear that correlation coefficient R value is 0.696, which indicates a positive correlation. The R<sup>2</sup> value indicates how much of the total variation in the dependent variable, Transformational Leadership, can be explained by the independent variables, organisational performance and organisational change. It is evident from the above table that 48.4% of the variation in the dependent variables can be explained by the independent variable, which is moderate.

### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	124.438	2	62.219	28.645	.000 <sup>b</sup>

Residual	132.499	61	2.172		
Total	256.937	63			

a. Dependent Variable: Transformational\_Leadership

b. Predictors: (Constant), Organizational\_Performance, Organisational\_Changes

The above table shows that the regression model predicts the dependent variable significantly well. The above table clearly shows the statistical significance of the regression model. Here,  $p = 0.000$  which is less than 0.05, and indicates that, overall, the regression model statistically significantly predicts the outcome variable (i.e., it is a good fit for the data).

### Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Beta	Lower Bound
1 (Constant)	2.069	.517		4.005	.000	1.036	3.102
Organisational_Changes	.209	.076	.293	2.738	.008	.056	.362
Organizational_Performance	.399	.086	.498	4.650	.000	.228	.571

a. Dependent Variable: Transformational\_Leadership

We can form the regression equation from the above table as:

$$\text{Transformational Leadership} = 2.069 + 0.209 (\text{Organisational Change}) + 0.399 (\text{Organisational Performance})$$

### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	119.202 <sup>a</sup>	35	.000
Likelihood Ratio	45.118	35	.118
Linear-by-Linear Association	21.178	1	.000
N of Valid Cases	64		

a. 45 cells (93.8%) have expected count less than 5. The minimum expected count is .02.

As the significance level,  $p < 0.05$ , we reject the null hypothesis and accept the alternate hypothesis that transformational leadership does not have a significant role between organisational performance and employee growth.

### **Implications of the study**

- Implications to the organization

Changes are inevitable for the sustainable growth and development of any organization. To adapt themselves to emerging organizational changes, organizations rely more on competent leaders with vision and innovations, who can motivate and influence their followers to achieve their set goals and objectives.

- Implications to the employees

The findings of the study will enable the employees the need of learning the different technologies which come to society to face uncertainty. The approach to technology indeed differs from person to person. But the presence of a transformational leader will motivate them to imbibe the changes in their life.

### **Conclusion**

In spite of many limitations study has following findings. In this research tried to investigate the relationship between transformational leadership and organisational performance at the time of organisational change. The study could identify that there is a positive relationship between transformational leadership and organisational performance. According to the regression analysis study could identify that there is a moderate significant relationship between transformational leadership and organisational changes. The study found that the third hypothesis, transformational leadership has no significant role in the organisational performance and employee growth. This research tries to communicate the role of a transformational leaders in the organisation especially at the time of organisational changes. Hence, they try to motivate, inspire and influence the followers to not to resist on the changes but rather to be aware about the positive sides and benefits of the changes that occur in the organization. Moreover, this study was an aim to identify certain steps through which transformational leadership influences employees' attitude to accept the organisational changes.

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# A Conceptual Framework on The influence of HRM practices on Employee Job satisfaction and commitment in Service Sectors

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## **Abstract**

*The concept of job satisfaction and commitment workplace is still one of the most challenging and researched concepts in the field of Human Resource Management.*

*In this era of a highly competitive environment, organizations in the Manufacturing sector and Service sector are trying hard to win the mind of customers by providing them with value-added service and quality innovative products to remain competitive in the market. The objective of this study is to investigate the impact of HRM practices on the Organizational Commitment of Employees in various sectors in India. The study revealed how HRM practices provide an edge to employees' commitment toward an organization's goal in the global competitive market. Through the study, it is found that HRM practices influence the Organizational Commitment of Employees.*

*It is widely believed that employee participation may affect employee job satisfaction; employee productivity, and employee commitment, and they all can create a comparative advantage for the organization.*

*This paper attempts to propose a conceptual framework consisting of human resources management (HRM) practice, job satisfaction, and commitment, and to explain the relationships among various variables. Job satisfaction played an important role in employee turnover because it would lead an employee to resign when their job satisfaction is low...*

**Keywords:** Human Resource Management Practice, Job Satisfaction, Turnover, Employee Commitment.

## **1. Introduction**

An Organization is a setup where individuals come together and work in unison to achieve a common goal is called as an organization. Individuals working together in an organization to earn their bread and butter as well as make profits are called employees. Employees are the lifeline of an organization and contribute effectively to its successful running and profit making. No organization can survive if the employees are not serious about it and are concerned about their interests.

### **1.1 HRM practices:**

Human resources (HR) departments play a pivotal role in setting the cultural tone of a company. The policies they issue and the way they conduct business diffuse through the company. Employees may take their cue on how to do their jobs from HR from the moment the company hires them. HR departments must model how they want other departments and individual employees to act to create a positive workplace culture as possible. Two of HR's main functions are to attract and retain high-quality professionals, and the culture they promote in the company affects these functions. The competencies of the HR department may influence this relationship.

There are different HR Practices for the organization to adopt. HR practices contribute to the organization's bottom line, areas such as recruitment, selection, training, development, and performance appraisal which should be consistent, integrated, and strategically focused. Firms need to build long-term commitment to retaining their workforce.

- **Human Resource Planning-** Effective management of human resources enables organizations to meet their current and future demands of talent. It also helps in anticipating and developing valuable skill for the organization which help to maintain the balance of staff in terms of available skill- sets and number of personnel (Goddard, 2020)
- **Recruitment technically precedes selection.** Selection is the process of choosing the most suitable persons out of all applicants. It is the process of matching the qualifications of applicants with job requirements. According to Dale Yodder (1972) Selection involves a Test, Interview, and Medical examination of the candidates. Referrals of candidates are also checked for predicting their behavior and performance.
- **Training and Development-** Training is the process of increasing the knowledge and skills for doing a particular job. The purpose of training is basically to bridge the gap between job requirements and the present competence of an employee. Training is aimed at improving the behavior and performance of persons. There are different types of training programs like Orientation training, Job training, Safety training, Promotional training, Refresher training, Remedial training, etc. to enhance the skills of employees. Executive development is a systematic process of learning and growth by which managerial personnel gain and apply knowledge, skills, attitudes, and insights to manage the work in their organizations efficiently and effectively.
- **Compensation-** Wage, Salaries, and other forms of employee compensation constitute a very large component of operating costs. No organization can expect to attract and retain qualified and motivated employees unless it pays them fair compensation. Employee compensation can be classified into two categories- Basic or Primary compensation and Supplementary compensation. Basic pay refers to pay in the form of wages and salaries. It is a fixed and non-incentive payment. Supplementary compensation consists of incentive and variable payments, based on either individual or the output of the group as a whole.
- **Performance Management –** Companies can inspire, monitor, and manage employees with the help of the right performance management process, tools and approaches. An effective performance management process needs commitment and dedication from the human resource management department, managers, and employees. Performance management helps in boosting employee engagement and productivity. It helps in creating employee development strategies. (Hearn, 2018)
- **Promotions and Transfers-** Promotion refers to the advancement of an employee to a higher post carrying greater responsibilities, higher status, and better salary. Promotion can be made on different criteria like seniority, merit, etc. They help to recognize an employee's performance and commitment. It also helps to boost morale and also help to develop a competitive spirit among employees for acquiring knowledge and

skills. Transfers refer to a horizontal or lateral movement of an employee from one job to another in the same organization without any significant change in status and pay. There are different purposes of transfers like to meet both organizational and employee needs, to make employees more versatile, to adjust the workforce, to provide relief, etc.

- **Welfare Schemes-** It means anything done for the intellectual physical, moral and economic betterment of employees by employers, Govt. or other agencies. These welfare services may be classified into Intramural and Extramural. Intramural services are provided within the establishment and Extramural services are provided outside the establishment. They help to increase employees' productivity, morale, industrial relation, goodwill, etc.
- **Reward and Recognition-** Employee recognition is as much an organizational management issue as it is one related to the basic needs of individuals. Employee recognition helps organizations motivate and retain employees. Motivated employees help organizations to achieve new heights.

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## **2. RESEARCH METHODOLOGY**

The idea of writing this paper is to study, analyze and examine the impact of HRM Practices on the Organizational Commitment of Employees. So, this research paper aims to develop a research model which can justify this paper and find out the possible ways of the influential role of HRM practices on Organizational Commitment. Hence, we have used Secondary data for our research. The source of data was secondary data that has been collected while studying various research papers and the results will be analyzed with the help of literature reviews.

### **2.1 Purpose of the Research**

HRM activities help sight, acquire and develop the skills and abilities of various of its working employees to attain the desired organizational goals while, employees, through these activities get their dues in the form of years of industrial and Professional Experience, Remuneration, Recognition, Career Advancement, etc. So, these HRM activities need to be effective enough for the organization and its employees respectively to attain the above-mentioned attributes. If the employees of an organization can receive the desired benefits through these HRM activities, the employees will continue to be fully satisfied. Hence, we can say that Employee Satisfaction is one of the indicators of effective HRM activities prevailing in the organization. Employee Satisfaction is one such element that can help determine the overall health of the organization. Hence, improving and maintaining the level of employee satisfaction in the organization is crucial with the effect of factors such as technology and communication, continuous change and renewal steps are taken in the organization to improve HRM practices. The basic objectives of the research are to find out the factors which impact employee satisfaction. The purpose of the current study is to analyze the relationship of human resource practices, training and development, performance management system compensation, reward – recognition practices of the organization on employee job satisfaction

## **3. Review of Literature**

It is said to be that Human resources (HR) are considered the heart of an organization. The performance of any organization especially in a service organization largely depends on the quality and competence of its employees and it is possible through proper practices of HR. The impact of Human Resource Management (HRM) practices popularly known as HR practices on organizational performance and employee attitudes has been a leading

area of research in the developed world for years. (Delaney and Huselid, 1996, Hselid, 195, Katouand Budhwar, 2007 peterescu and Ximmns, 2008) [1].The success, survival, and competing power of organizations depend on the commitment of their members, supporting their individual developments, and ensuring their participation. The purpose of this study is to gain a better understanding of the relationships between job satisfaction, and organizational commitment. . Job satisfaction is defined by Ivancevich as an attitude that individuals have about their jobs and it is believed to be a result of the perception of individuals of their jobs or it is defined by Greenberg that it is a person's positive or negative feelings about their jobs. In 1990, Allen and Meyer defined Organizational Commitment as a bond or linking of the individual to the organization. Job satisfaction is a prerequisite for employee commitment to the organization. Management needs to know the ways the employees are committed to the organization. If the employees are satisfied as well as well committed to the organization it helps to reduce the cost of employee turnover, absenteeism, low productivity, etc. Therefore this study attempts to add a valued work to explain the causal relationship between HRM practices and employees' commitment. To ensure efficiency and retain the competitive advantage, the organization needs to design effective HR practices that encourage the high performance of employees. So this study discusses some of the important factors which have a relationship with organizational commitment and job satisfaction that may directly or indirectly influence the commitment of employees to the organization.

**3.1 Organization commitment:** An employee is a member of a collective and this invisible tie between an employee and a collective is being studied when we are interested in organizational commitment. Every employee's attachment to the organization varies and there can be numerous reasons behind this attachment, for example, affection, rational choice, or habit. A big part of commitment is how employees see the company and the differences that set it apart from all the other possible employers. Having committed employees is crucial for a successful company. If the company uses a lot of resources to find the correct persons for the job, it is extremely important to be able to keep them in the long run. Commitment comes into play in this process. On the other hand, it is important to study commitment and know the factors affecting it because it has the potential to influence organizational effectiveness and employees' well-being.

### **3.2 Job Satisfaction**

The concept of employee job satisfaction is a multidimensional and interdisciplinary term that has attracted the attention of researchers and practitioners from different disciplines such as psychology, human resource management, organizational behavior, TQM, and so forth. In literature, there are a large number of studies that analyze the term from many different perspectives and its relationship with various organizational variables (Lund, 2003). However, there is no universal definition of employee satisfaction that exposes all these dimensions at the same time. Most of the definitions emphasize the importance of employees' job-related perceptions that link their expectations of them and what they receive in return. Locke, et. Al (1969) describes job satisfaction as a pleasurable or positive emotional state resulting from the appraisal of one's job and job experiences. According to this, employee satisfaction is a "function of the perceived relationship between what one wants from one's job and what one perceives it as offering" (Locke, 1969). Robbins (2010) in his book said Job satisfaction is a general attitude of employees either favorable or unfavorable toward the job. Job satisfaction is considered a mediator between organizational HR practices and employee commitment. It is said employee job satisfaction comes from satisfaction with organizational practices especially HR practices; and employee commitment is a result of the extreme level of employee job satisfaction. Job satisfaction is dependent on many interrelated factors like the personal factors of the

person, socio-cultural factors of the environment, and organizational HR practices. Among these three factors, HR practices have a primary influence on job satisfaction. Job-related HR practices or specific aspects of the job are Manpower planning, job design, working conditions, relations with co-workers, job status, wage, fringe benefits, supervision, promotional opportunities, job security, communication, organizational structure & climate, management participation, leadership style, autonomy at work, work-schedule & nature of work, performance management, rewards & recognition and so on.

### **3.3 Relationships among HR practices, Job Satisfaction, and Organizational Commitment**

Employee job satisfaction depends on many human resource factors instead of a single one. It is difficult to estimate employee job satisfaction on specific HR practices because organizational human resource activities are changing continuously and job satisfaction is a person's psychological matter. But employee job satisfaction in the organization is found in our research as closely associated with organizational human resource activities. Job satisfaction is also linked with improved output and Organizational commitment. There is no hesitation to say that organizational commitment directs by job satisfaction. In addition, organizational HR practices directly can produce employee commitment by considering employee satisfaction.

## **4. Research Findings**

The study found out that HRM practices such as Compensation, Training & Development and Employee participation, Job security, and Job performance play a significant role in Organization Commitment. While it is found that HRM practices such as Compensation, Job security, and Job performance has significant importance on Affective commitment but same HRM policies cannot be set for two different sets of identities among private Universities across the globe. In the academic sector, HRM practices viz. career development and job satisfaction have a significant impact on Organization Commitment. In the Hospital industry, supportive reward-oriented HRM Practices increase employee commitment to Organization. In contrast to this, Employees from the IT software industry are influenced by HRM policies such as Training, Career development, and a friendly work environment. In high-tech industries, affective commitment has a pivotal role. However, the research on blue-collar employees in manufacturing industries found that HRM policies such as job satisfaction and pay satisfaction have a significant role in achieving organizational commitment. On the other hand, research conducted on Law firms suggested that Employee welfare and process-oriented HRM policies might be the path to achieving better organizational commitment.

## **5. Recommendations**

Organizations are under constant pressure to improve their performance and ensure development. To achieve these primary objectives, organizations are creating new policies and plans. Human resource functions are responsible for designing and managing the talent management process. Employee Satisfaction is very important for every organization. Organizations should pay due attention to employees' needs and focus on satisfying their needs. Organizations should emphasize providing constructive feedback to employees. They should get paid based on their contribution. Compensation, Reward, and recognition should be based on employee performance. An organization should develop training and development practices as per the need of the organization. HR practices shape the skills, attitudes, and behavior of an organization's workforce, and these

skills, attitudes, and behavior in turn influence organizational behavior HR practices can have a direct impact on firm performance by creating structural and operational efficiencies HRM practices should aim at reducing employee absenteeism, attrition, and improve the quality of work. Satisfied employees help the organization deliver desired performance to be competitive in a business environment.

Employee Satisfaction is one of the important attributes that every organization must pay due attention to. Every organization must keep updating and improving its HRM practices at regular intervals so that it cannot only increase the efficiency of its practices but also can be highly competitive and market-relevant in the long run. Following this will help an organization in keeping its employees happy and content which will ultimately lead to employee retention and loyalty. Every organization should keep innovating and trying new ways of improving the level of efficiency and employee satisfaction even if it is practically difficult to know the actual attribute that can keep an employee content. Employee Satisfaction is one of the indicators of efficiency of different kinds of functions prevailing in the organization. It has also been proved that if the level of efficiency of all the functions improves, the level of employee satisfaction will also improve.

## **6. Conclusion**

The conclusion builds on previous research that shows that HRM practices such as Training & development, compensation, and welfare activities have a significant effect on Organizational commitment and are associated with superior organizational performance. The study depicts the result from the various sector viz. Banking, Academics, IT software industry, high tech Innovation Industries, Manufacturing Industries, etc. However, it is very difficult to achieve customer-centric strategic management without first achieving employee satisfaction. Also when employees are satisfied, it results in customer satisfaction which ultimately increases the profitability and goodwill of the firm. Therefore, it is proved in the study, that HRM practices have a significant impact on Organizational commitment and which is further related to the Retention of knowledgeable and skilled Employees.

One major difference between the public and the private sector seems to be the attention devoted to HR practices. HRM is 'big' in business administration as is proved by the enormous number of books and articles on HRM. Organizational performance and employee productivity in both public and private sectors largely depend on employee satisfaction and commitment. HR practices, job satisfaction, and organizational commitment are interrelated. These three important terminologies are very essential conditions for the retention of employees, productivity, and success of any organization, especially in the organization.

The role of HR practices is to assure the needs of employees through terms of training, rewards systems, equality of treatment, and benefits, among others, to further employee commitment and reduce the rate of employee turnover. The workplace environment needs to be made fully fit for the needs of all employees by ensuring leadership styles that encourage decentralization and delegation of duties, equality in the implementation of employee evaluation and appraisal systems, and provision of enough employee benefits, rewards, and structure for recognition.

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# Impact of demographic and work-related profile of IT Employees on their Emotional Intelligence – A study across select IT Companies in Bangalore City

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**Abstract:** *Emotional quotient is increasingly seen as a determinant of individual success and productivity (EI). Many scholars believe that EI affects individual performance, despite some disagreement about how to assess it. Self-efficacy is an important component of psychological capital, and it is positively correlated with EI. Since organizations are always looking to better manage their human resources, the subject of EI remains current. It is crucial in this context to keep your EI levels strong, as they're linked to your adaptability to new situations and different people. EI can be affected by a variety of things, though. The degree of EI is affected by a variety of personal and environmental variables. Some academics have proposed that EI might be improved by the implementation of various educational and awareness initiatives. Given this, the current research examined the associations between EI and a variety of demographic (age, gender, educational attainment, marital status, and yearly income) and occupational (job positions, experience, workshift, work hours, overtime, and flexitime) aspects. 130 IT professionals were included in the exploratory research. Cochran's formula for estimating a sample size from a sample of a known population with a 95% confidence level and a 10% margin of error is used for this research of employees. The questionnaire utilized was a modified version of the 2012 Goleman EI Scale, which is known for its structure. The Hypothesis was tested using SPSS's ANOVA and independent t tests. Researchers found that workers over the age of 45 had higher levels of emotional intelligence. Emotional intelligence factors have little to no bearing on marital status or monthly income. Women, on general, possess a more developed sense of self-awareness than men do. A large portion of the Work profile's components were unimportant. Several socioeconomic and occupational factors were shown to be significantly associated with differences in EI levels among IT workers. Demographic and occupational traits may have a genuine influence on EI, despite the fact that the bulk of these variables were statistically insignificant. Findings suggest that research is required to develop comparisons between IT professionals and Other Knowledge workers.*

**Keywords:** Emotional Intelligence, work Profile, Demographic profile, IT employees

## **I. Introduction**

Emotional intelligence (EI) is increasingly acknowledged as a predictor of individual productivity and performance (Bande, Fernández-Fern, Varela, & Jaramillo, 2015). In spite of criticism directed at existing measurement measures, many authors agree that EI has an impact on individual performance (Murphy, 2014). Researchers have shown a significant correlation between EI and self-efficacy, a key component of psychological

capital (Pradhan, Jena, and Sing , 2017). Since businesses are always striving to improve the efficiency and effectiveness of their human resources, EI will continue to be a hot issue. Keeping up a high level of emotional intelligence (EI) is crucial in this regard since it is closely tied to one's adaptability to new situations and circumstances (Kaufmann & Wagner, 2017).

There are aspects of any profession that can be stressful and upsetting to the people who do it (Oatley & Johnson-Laird, 2014). In contrast, the results of this study suggest that those working in IT may be experiencing more emotional disharmony than the average worker. The increased mobility of human capital across national and continental boundaries has also increased competition in the IT sector. Since then, research has grown in significance within the academic community (Andrés, Asongu, & Amavilah, 2015) and the whole global economy has become knowledge-driven.

The number of students enrolling in universities every year has been rising over the previous two decades (Coates et al., 2015). Further, professional work in the IT field requires social interaction. All of these things have the potential to make people feel bad, and if those feelings aren't dealt with, they can have a negative impact on performance.

Accordingly, EI is applied to enhance not just communication (Jorfi, Yaccob, & Shah, 2011), but also workplace and organizational psychology (Vratskikh et al., 2016) and personal psychological health and well-being (Steyn, 2010). Since EI may affect one's success in a number of settings, knowing one's EI level is crucial.

There are, however, a number of factors that can influence how much an individual's EI changes. According to the authors, biological, psychological, and social factors all contribute to an individual's degree of EI (Pooja and Kumar , 2016). Scholars have argued that EI may be enhanced by training and education (Ebrahimi, Khoshshima, & Zare Behtash, 2018). In light of previous research (Hemalatha, 2014) and (Kónya, Matic, & Pavlovic, 2016), The current study investigated the relationships between demographic (age, gender, qualification, marital status, & annual income) and occupational (job roles, experience, workshift, work hours, overtime, & flexitime) variables and EI.

## **II. Review of Literature**

S. Kallou and S. Samanta (2020) Aging also has an effect on both emotionally intelligent and unproductive work behavior. Chalkida Municipality workers have a high level of emotional intelligence, which suggests they are not likely to participate in disruptive behavior at work. Researchers in Malaysia looked into how demographic factors affected the EQ of college teachers in the country's polytechnics (Kumar & Muniandy, 2012). Researchers found that educators' emotional intelligence increased with years of experience, rank, and formal education. However, the EI rule did not take into account factors such as gender differences or previous work experience. Researchers have found no differences in emotional intelligence between sexes (Daniel Goleman,1998, 2001). Other studies have shown that women generally have greater levels of emotional intelligence than men do, both in everyday life and in the workplace. Cruz argues that women have more emotional intelligence at home and in the workplace (2004). Researchers believe that the differences in male and female pursuits reflect masculine and feminine aspects of society and human values. (Petrides, Furnham, & Frederickson, 2004) used a correlation sample of 261 English citizens to investigate gender variations in self-esteem. Researchers observed that participants' perceptions of their own emotional intelligence were significantly affected by their gender.

Studies show that women are more empathetic and attentive, while men are better at controlling their feelings (Austin, Erans, Goldwater, & Potter, 2005). Researchers looked into how factors including age, gender, and race were related (Bar-On, 2000). The results showed that while there were no significant gender differences in EI in terms of overall emotional and social competence, there were variations in several subdomains of EI. Studies have found that women are more emotionally intelligent, compassionate, and sociable than men. It would indicate that men are more capable of handling challenges and stress than women are, as well as being more self-reliant, agile, and confident. He discovered more similarities than differences between men's and women's emotional intelligence. Therefore, there are no significant differences between the sexes in terms of total EI. Various findings were uncovered from the literature research on the topic of gender and emotional quotient. The researcher concludes that more investigation on EI and gender is required.

(Min, 2010) looked into how variables including age, marital status, and tour guide training influenced the correlation between EQ and IQ. According to the results, there were significant differences in EI across genders and between service lengths. Results from some research have linked emotional intelligence to job tenure, whereas others have not. There were no significant variations in EQ between male and female Malaysian VTC teachers (Mustafa et al., 2014).

According to a study conducted on bank workers in Greece, emotional intelligence varies with age, marital status, job title, and gender (Papathanasiou & Siati, 2014). Specifically, (Rahim & Malik, 2010) looked on how age, gender, and education level affected EQ and performance in the workplace. Female bank employees were shown to have higher emotional intelligence than their male colleagues, and there was a negative link between age and emotional intelligence for both sexes. In addition, research suggests that a person's emotional intelligence improves in tandem with their degree of schooling. According to studies, a positive work environment leads to higher productivity from employees. It has been hypothesized that gender and chronological age have a role in the maturation of emotional intelligence (Mo & Dainty, 2007). Researchers found that there was a large gap in the emotional intelligence of managers (Mandell and Pherwani, 2003).

(Mishra and Mohapatra, 2010) The impact of variables such as gender, educational level, and rate of retention on measures of emotional intelligence were investigated. According to the results, higher degrees of emotional maturity are associated with better levels of executive function. Researchers discovered a correlation between work experience and IQ. Leaders with more years of experience tend to be better communicators than those with less. According to research (Gani, 2013), there are no discernible gender gaps in the level of emotional intelligence displayed by male and female employees. The researchers found that females outperformed males on the Emotional Recognition and Speech Factor tests. According to the research, emotional maturity and intuition were more common among female managers who exhibited transformational leadership behaviors than among male managers (Downey et al., 2005). It has been shown that assessing Emotional Intelligence (EI) in the workplace is a more accurate predictor of transformative leadership practices than the standard EI exam.

However, there is a lack of research on the many elements that affect a person's level of EI. The degree of EI is affected by a variety of personal and environmental variables. Some academics believe that EI may be improved, most likely by education and exposure lectures. Based on the findings of (Hemalatha, 2014) and (Kónya, Matic, and Pavlovic, 2016), this study examined demographic (age, gender, qualification, marital status, and annual income) and work-related (job roles, experience, workshift, work hours, overtime, and flexitime) variables as predictors of EI levels.

### III. Objectives

- To understand the current Emotional Intelligence levels of IT Employees
- To analyse the impact of demographic profile of IT Employees on their Emotional Intelligence
- To analyse the impact of work related profile of IT Employees on their Emotional Intelligence
- 

### IV. Hypothesis

H1: The emotional intelligence of IT workers is significantly affected by factors relevant to their demographics

H2: The emotional intelligence of IT workers is significantly affected by factors relevant to their jobs

### V. Research Methods

Table 5- Research Methods

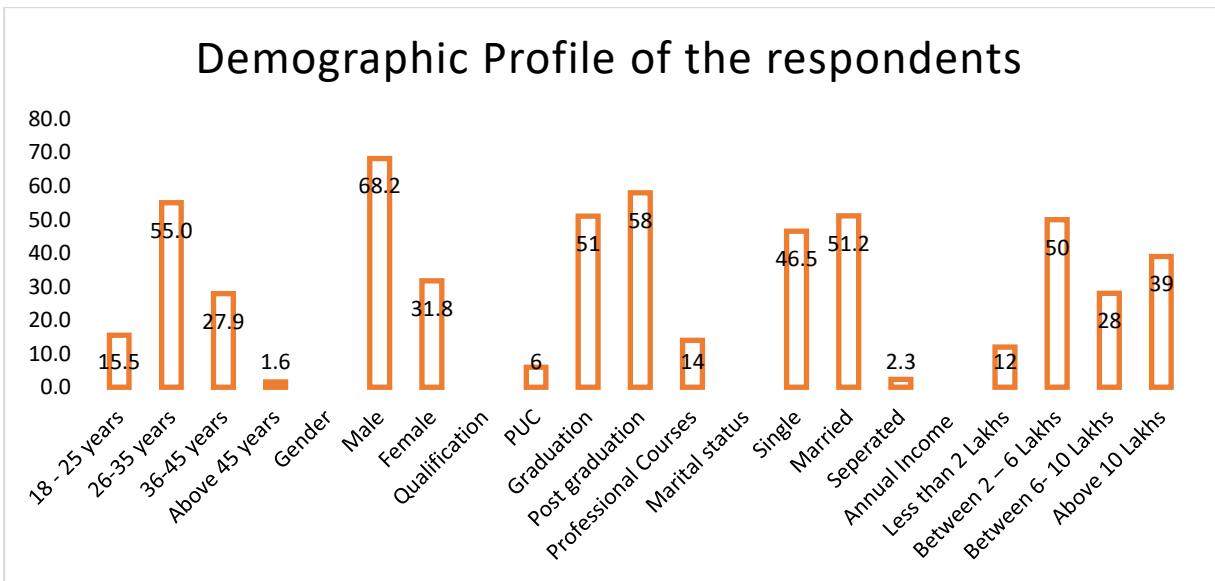
<b>Research Type</b>	<b>Exploratory research</b>
<b>Data collection tools</b>	Questionnaire Questionnaire consisting of 3 Parts Part One : Information on the Demographic profile of the respondent (Multiple choices) Part Two : Information on the Work profile of the respondent (Multiple choices) Part Three : Questions related to elements of Self-Management-emotional intelligence (LIKERT Scale-5 Points)
<b>Data collection Techniques</b>	Interviews (Where ever possible) and Google forms
<b>Sampling: Population</b>	IT employees in Bangalore City 15,00,000 Employees
<b>Determination of sample size</b>	Cochran Formula of Known Population $n = \frac{\frac{z^2 * p(1 - p)}{e^2}}{1 + \left(\frac{z^2 * p(1 - p)}{e^2 N}\right)} = \frac{\frac{1.959964^2 * 0.5(1 - 0.5)}{0.10^2}}{1 + \left(\frac{1.959964^2 * 0.5(1 - 0.5)}{0.10^2 * 1500000}\right)}$ <p>= 95% confidence level and 10% margin of error, sample size of 100 respondents</p>
<b>Sampling Frame</b>	IT Employees in Bangalore city – (Top 10 IT Companies as per market cap)
<b>Sampling Technique</b>	Convenient sampling

<b>Sample</b>	150 Questionnaires were distributed and 130 valid responses were selected for the study
<b>Pilot Study</b>	The questionnaire was pre tested with 10 IT employees and slight changes were made to the questionnaire
<b>Plan of Analysis</b>	EFA -SPSS Software CFA- AMOS Software

## VI. Results and Discussion

### 6.1 Demographic Profile of the respondents

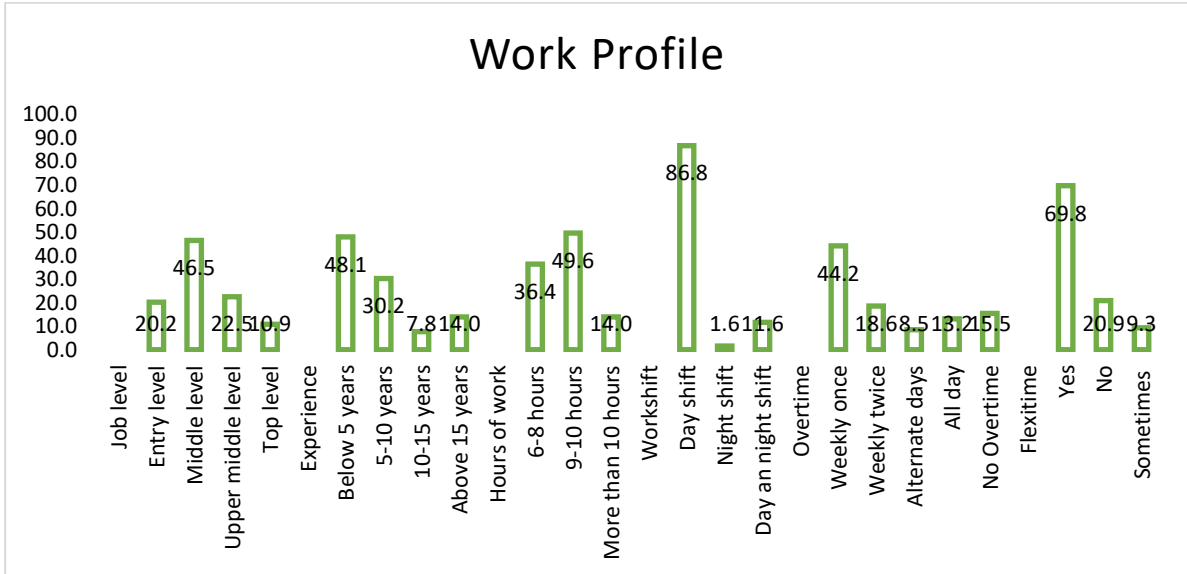
Chart 1 – Demographic Profile of the respondents



A majority of 55% of the IT Employees are in the age group of 26-45 years, 27.9% respondents are in the age group of 36-45 years. A very percentage of respondents are in the range of 18-25 years and above 45 years. 68.2 % respondents are male and remaining 31.8% are Female. As per the IT Gender diversity, IT industry has 26% women employees, which is the same with the respondents under the study. A majority 58% of respondents have completed their Post-graduation, 51% have completed their graduation. As the study is carried out across IT Industry, A preponderance respondents are highly qualified. About half 51.2 % respondents are married, 46.5% respondents are single. Half of the respondents under study earn between 2-6 lakhs, 39% earn above 10 lakhs.

### 6.2 Work profile of the respondents

Chart 2– Work Profile of the respondents



When enquired about the Job levels, 46.5% respondents are in the Middle level, 22.5% respondents are in the Upper Middle level, 20.2% IT employees are in Entry Level. A very small percentage of employees are in Top level. 48.1% respondents have below 5 years of experience, 30.2% respondents have 5-10 years. A cumulative 21% respondent have above 10 years of experience. A majority of 49.6% respondents work 9-10 hours, 36.4 % IT Employees worked for 6-8 hours. A very small 14% respondent’s work for more than 10 hours a day. 86.8% IT Employees worked in Day shift.44.2percentage respondents worked overtime once in a week and 15.5% IT Employees did not work overtime. 69.8% respondents had the option of flexitime.

### 6.3 Descriptive statistics – Emotional Intelligence

Table 6- Descriptive statistics – Emotional Intelligence

#### Descriptive Statistics

	N	Mean	Std. Deviation	Skewness	Kurtosis		
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Self-awareness	130	3.77	.593	.115	.213	-.436	.423
Self-Management	130	3.78	.696	-.386	.213	.287	.423
Social Awareness	130	3.81	.830	-.622	.213	.902	.423
Relationship Mgt	130	4.08	.740	-1.039	.213	2.882	.423

The descriptive statistics for 4 items under emotional intelligence are illustrated in the table above. Self-awareness has the least mean score of 3.77 indicating neutral to agreement range of responses. Relationship management has the highest mean score of 4.08 indicating agreement to strong agreement range of responses. The standard deviation is below 1.000 indicating that all the IT Employees under the current study have similar range of responses. Kurtosis is a measure of the shape of the current curve in relation to the normal distribution, while skewness is a measure of how the answers are distributed. The accepted range of Skewness is -1 to +1 and kurtosis is -3 to +3 according to (Hair and

et al, 2007). More responses are placed to the right when the skewness is negative. Positive skewness also shows answers that are skewed to the left. The skewness values for emotional intelligence items are negative, fall inside the acceptable limit, and are tailed to the right, suggesting that more respondents agree. All emotional intelligence components have Kurtosis within acceptable bounds, suggesting that they are close to the Normal Distribution.

#### 6.4 Testing of Hypothesis

H1: The emotional intelligence of IT workers is significantly affected by factors relevant to their demographics

Table.7 – Statistical test Results for Hypothesis 1

Demographic Variables	ANOVA- F Statistics				Independent t test
	Age	Qualification	Marital Status	Monthly Income	
Self-awareness	3.334*	3.687*	0.565	0.659	6.196*
Self-Management	4.922*	1.835	0.151	3.034	4.547
Social Awareness	9.827*	1.217	0.276	2.413	4.029
Relationship Mgt	13.678*	1.392	0.037	2.289	1.361
<b>* Indicates significance – Which is also shown in Chart 3</b>					

- Emotional intelligence items are statistically significant for atleast one of the Age groups at p value =.000. The scheffe post hoc results show that employees who are in age group of above 45 years have higher emotional intelligence. The findings of the current study are in line with previous findings that Emotional intelligence is positively related to age ( Tsaousis & Kazi, 2013). As people become older, they may be more likely to understand their own and others' emotions as a result of their life experiences and learning (Kaufman et al., 2008).
- Self Awareness item is statistically significant for atleast one of the Qualification groups at p value =.000. All other Emotional intelligence items are insignificant. The study's findings are consistent with (Pooja P, Kumar P, 2016), which found that EI values varied by qualification, with non-technical personnel in the Indian service industry being more emotionally intelligent than their technical counterparts. Employees with professional degrees are more emotionally intelligent in the current study.
- Emotional intelligence items are insignificant for marital status and Monthly Income. (Farzana Bibi, 2015) This research also found no significant differences in emotional intelligence between married and single university professors.
- In case of gender, only self-awareness is statistically significant and female have higher self-awareness as compared to men. The findings of the study corroborate those of (Meshkat M, Nejati R, 2017), who found that genders differed in emotional self-awareness, interpersonal relationships, self-esteem, and empathy, with females scoring better than males.

H2: The emotional intelligence of IT workers is significantly affected by factors relevant to their jobs

Table 8 - Statistical test Results for Hypothesis 2

Work related variables	Job roles	Experience	Hours of work	Work shift	Overtime
Self-awareness	1.275	2.632	2.412	1.612	1.398
Self-Management	0.997	3.538*	3.818*	1.613	1.038
Social Awareness	2.358	7.226*	8.180*	0.913	1.591
Relationship Mgt	2.127	3.736*	3.724*	1.535	0.808
* Indicates significance – Which is also shown in Chart 4					

- Job roles are insignificant in making any impact on the emotional intelligence items as the significance values are above the expected p value of 0.05
- Self-Management, Social Awareness and Relationship Management are statistically significant for atleast one of the Experience groups at p value =.000. The scheffe post hoc results show that employees who have above 10 years of experience have higher emotional intelligence
- Self-Management, Social Awareness and Relationship Management are statistically significant for atleast one of the work hours groups at p value =.000. The scheffe post hoc results show that employees who work between 6-8 hours have higher emotional intelligence
- Work shifts are insignificant in making any impact on the emotional intelligence items as the significance values are above the expected p value of 0.05
- Overtime are insignificant in making any impact on the emotional intelligence items as the significance values are above the expected p value of 0.05

Suggestions

- Employees who are below 45 years need to access their emotional intelligence through questionnaires and try to adopt to some of the techniques to improve Emotional intelligence. Organizations can take up activities and training programmes to enhance the EI of employees who are below 45 years
- IT Male employees can work on their self-awareness, Organizations can set up special programmes for men to enhance their self-awareness.
- Post graduates in technical field need to enhance their emotional skills to be equally competent with their non-technical counterparts. During the training sessions, importance has to be given to Technical employees so as to improve their emotional knowledge

Conclusion

This study adds to the body of knowledge on EI and IT employees. The study's findings have ramifications for IT employees seeking to grow and develop individually in their careers, as well as human resources operations and career counsellors. Based on different demographic and work-related factors, differences in EI levels among IT employees were discovered. Despite the fact that the bulk of these factors were statistically insignificant, it is possible that demographic and occupational factors have a genuine influence on EI.



Further research is needed to make comparisons between IT personnel and Other Knowledge workers, according to the findings.

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## Significance of Social Media in HR

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### **ABSTRACT**

*In today's time social-media (SM) as an automated platform has a tremendous impact on how we interact, connect, collaborate, and share information with friends, family members, relatives, colleagues, and other connections. With the rise of Social-Media (SM) and Social networking channels (SNS) like LinkedIn, Facebook, Twitter, Instagram among others everyone has got an equal chance of say and being heard. Social Media acts as an enabler, in the sense it enables people to share events that range from the experiences of their personal life, career goals and aspirations to matters of social importance. Given these advantages of Social Media, it is believed by the organization that this medium could be of indispensable use to it, while its uses or application is seen evidently in several areas of business. SM's presence is quintessential for Marketing, Managing and Engaging Human Resources. Human Resources is the function that deals with all the employee related concerns like payroll, talent acquisition, learning and development, employee engagement, work environment and corporate brand building. The objective of the study is to review Social Media's impact in various HR functions. The paper is a review work which aims to bring into light the significance of SM in various HR functions.*

**Keywords:** Social Media (SM), Social Networking Sites (SNS), Human Resources (HR), HR functions, Challenges.

### **Introduction to Significance of SM in Human Resources**

SM has democratized the communication to a greater extent. A translucent and structured SM framework allows personnel to foster two-way healthy communication. Apart from strengthening employer-employee communication, SM offers a frame for employee recognition, retention, to give out the point of views and settle the complaints. It also facilitates collaboration of employees with the establishment of active employee communities online, thereby assuring virtual presence of employees at all times (SHRM India, 2018).

As organizations expand in length and breadth, HR personnel fully agree to the fact that recruiting and hiring the right candidates who are creative and innovative is the greatest challenge. The right manpower being the scarce resource will disable the Talent acquisition teams to seek for the most sought after candidates by just relying on conventional sources of recruitment. Social Networking sites like LinkedIn which is designed specifically for the business community and Facebook known for its seamless connectivity and outreach allows recruiters to target the talent across the platform from all over the world by cutting the diversity barriers. Through Social Media communication has changed both internally and externally in organizations (SHRM India, 2018). HR uses social media to enhance the two-way dialogues between its employer and employees. The role of HR goes beyond just updating the spreadsheets with employee details to understanding the pulse of its members, being able to connect, engage and deal with concerns that matter people the most helps address the issues quickly that hover in the open discussion. The virtual discussions across a company are very crucial for constructing the employer's brand in the market. Therefore, being watchful around the organization's information floating on the Social Networking Sites (SNS) and taking all necessary care to break all forms of fabricated news about the organization on such a wider vehicle is a real-time challenge (Ravi Chandran, 2021).

## Literature Review

1. Awana Swati (2018) has described how corporate companies have applied SM to improve innovation, knowledge making and provided innumerable chance and settlement for both and business. According to the author's study SM websites are the most time-efficient, less expensive, and adaptable means that may be used by recruiters for effective way of searching for employees.
2. Miller (2012) states in the study that the work functionality of HRM could be improved through the application of SM as it is swiftly shifting in response to technology innovations.
3. Haag, and Cummings, 2013 in their study quote that Social Media is driven by participative web that lets people socialize with support of high-tech assets such as personal computers, laptops, cell phones representing Social-Networking-Sites, public-purchasing, social-merchandising, gaming and site-tracing are the aspects of social-media.
4. Kluemper & Rosen, 2009, in their study describe LinkedIn, as a job-oriented Social Networking Site documents the specialized knowledge about users, which could be considered and employed by the talent acquisition personnel to draw proficient potential recruits.
5. Melanthiou et al., 2015, indicate in the paper that e-recruitment is specified as the acceptance of network in hiring job-candidates. With further technological changes companies have been enticed to use SM for various professional functions like branding, hiring & selection, antecedent verification. Therefore, many enterprises of late use the concern's Social-Media's outline pages in FB and Linked In for selecting applicants.
6. Hosain and Liu, 2020; Andrews, 2012 in their study declare that several companies at current create and manage own company FB and Linked In profiles vigorously use these pages as the medium of advert means in appealing talent around the globe.

7. Phillips-Wren G, Doran R, Merrill K, 2016 in their paper state SM channel-based approaches facilitate the hiring executives to get to the job candidates and customize content to enhance the selection process.
8. Ladkin A, Buhalis D, 2016 in their study assert that fairness in the method of electronic-recruitment is important to retain image status and prevent any kind of lawful consequences.
9. Wayne F. Cascio, 2014 describes the purpose of groundbreaking methods to create & provide expertise driving HR Development plans such as e-Learning & Social-Learning devices as tactics are the essential aspects for worker maintenance.
10. Orlikowski 2000, Silverman 1993 together focus on skills in practice, on what tools are really being utilized as opposed to what advancements should be used, in order to have a deeper knowledge of real-life and continuing trend of SM in companies.

### **Objective of the Study**

To review Social Media's role and importance in various HR functions

### **Methodology**

This is a conceptual paper built based on reviews from literature. The review of literature helps to know the significance of SM in HR and challenges faced by the organization stakeholders using the medium. The study is based on secondary information which is collated from research papers, reports, articles, and different websites. An explanatory type of research is carried out to have a better understanding of importance of SM to HR personnel.

### **Role of Social Media in HR**

#### **1. Augments Recruitment efforts**

Majority of the organizations today rely maximum on social media for enticing potential candidates, the very simple reason being the current workforce the most of who belong to the Gen Y and Gen Z category are all active users of social media. Both active and passive working candidates are very active on social networking sites. Social media reduces the amount of effort that goes into hiring and making quality placements because the platform provides a wide mix of profiles of job candidates seeking for jobs. To simplify the candidate search it is indeed required by the recruiters to first identify those platforms where prospective candidates are active. For example, IT professionals with mid-level experience use LinkedIn, Software Developers prefer boards like Reddit and GitHub, and writers may use Twitter or other social community platforms more often. Once the presence of target audience is identified, the next step is to post relevant and useful content at regular intervals, use hashtags to make it easier to find information with a specific theme, title or content. Consistent interaction with the followers, who could be likely candidates for an organization improves the chances of hiring best candidates. Present employees may also be encouraged to contribute to accessible positions on the company's SM networks as well (Tarika Arun, 2021)

#### **2. Develops Employer branding**

A company which is vivid in its culture can showcase itself through SM as a vibrant culture oriented organization. Using its SM account for the purpose will surely improve its brand image. For example, if the enterprise is for diversity and inclusion, it can

highlight this in its job postings and openings. This gives scope to prospective candidates to think and act accordingly before applying for jobs. If there is any opportunity to capture the life of the employees during any day in the company, then it's the best possible way to do it on SM. Employees may be moved to share, like or comment content from their end about the organization, this kind of staff-created content can have an enormous effect on the brand image of the company (Tarika Arun, 2021).

### **3. Makes Training Programs robust**

Employee Training, Development and Learning programs are today combined with SM to make learning more accessible, fun-filled and embrace good number of participations from internal members as well as external members. Social-media surveys can be used to interpret what employees anticipate from such training programmes, therefore it acts as a structured feedback system and enable the training teams to know where they stand. Social Media channels like LinkedIn will promote connections between trainers and learners/participants, it may also be used as a medium to introduce the trainers. SMCs therefore can be used as a great tool to enhance knowledge sharing, brainstorming, researching and collaborative learning (Tarika Arun, 2021).

### **4. Promotes Employee Recognition**

With the WFH or remote working option employees and their managers don't get to catch up with each other physically. SM channels may be used strategically in such an instance to keep the employees motivated to work and show their unending productivity. To do this organizations have now opted to use these public spaces online to recognize, applaud and appreciate its people. By doing this the organization doesn't just improve the morale, engagement and satisfaction of its people but it also evokes responsibility, credibility and loyalty among its members. Peer-to-peer recognition is also the best way to uplift team motivation and productivity (Tarika Arun, 2021).

### **5. Professional networking**

Human Resource experts get to network with friends, keep pace with competitors and help attract users whose beliefs line up with the company's values. For HR professionals it's the easiest way to stay connected to Knowledge and subject matter experts, employees, prospective job candidates, Strategy consultants, outsourcing consultancies, various social communities including HR communities and forums, all of this acts as the authentic source of networking avenues (Pawaskar Divyanshu, Sharma Priya, Bhattacharya Sanjay, 2021). HR personnel use the social media services to deliver communications on policies, benefit schemes etc to stay connected with its members at all times.

### **6. Employee Engagement**

Social media plays a crucial role in bringing out employee-engagement through blogs, live sessions & videos so as to keep them well-informed with the most recent events in the organization. SNS by serving as a channel for knowledge-sharing and learning reduces the outlay on engaging personnel on several aspects of the organization (Wolf, Maxim; Sims, Julian; and Yang, Huadong, 2014).

### **7. Monitor Employees Activities**

SM allows the Human Resource personnel to examine the events of their people. If members are publishing on their respective social-media accounts and those columns may not relate to work, in a negative way, then the organization can impose a social-media plan in place. Few enterprises allow members to use SM during the day so long as their columns correlate to the company in a constructive way. For a case, Newspapers, TV broadcast stations and radio channels encourage their members to put up on SM platforms consistently in order to keep the viewers or society educated (Alan Draper, 2022).

### **8. Fosters Work-Life balance**

An organizational culture that promotes inclusion and communication among its employees flourishes towards success. SM may be used as a powerful tool to highlight some of the organization's key learning and development stories of its members and showcase how their leaders facilitate success for its people at work and at home. Giving candidates a realistic view of the existing members life through them via Social Media increases the probability of attracting skilled candidates in the upcoming future (Forbes Human Resources Council, 2022).

### **9. Empowers employees to tell their stories guilt-free**

Today people trust people more than organizations. Therefore, recognizing people and enabling them to share their stories is incredibly gainful. The insights provided by the present employees offers highest credibility to the messages of the organization posted through its people. Such engaging content could be posted in spaces like LinkedIn Life for instance to boost the internal pride, engagement levels of employees and generate more likes, shares and engagement among people outside the organization.

### **10. Reassessing Corporate values (Slideshare)**

Social Media has dramatically changed the way how businesses operate today. Organizations are able to collaborate, exchange resources, knowledge and expertise faster from varied sources to build business solutions that help participants deliver constructive results for the betterment of life of customers and the ecosystem as a whole. Social Media provides a platform to such corporates to redefine their values and showcase the same in truth.

### **11. Inspires Innovation**

SM tools have a lot of potential for cooperation and involvement of real-time ideas or resolutions with group members. Employers could be using SM tools as formal modes of communication to team up with its people and leadership hierarchies around policies, practices and methodologies of the business.

## **Conclusion**

Through the review work it may be inferred that SM and Social Networking Sites offer several opportunities to organizations with specific emphasis on how they are used creatively in HR functions that include recruitment and selection, employer branding, employee recognition and retention, monitoring employee activities, fostering work-life balance, innovation etc. through the review of few papers it is known that Social Media is extensively used and proclaimed by few industries and sectors like medical care, administration, education & in the public sector the merits of using SM has not been so prevailing (Awana Swati, 2018). My review paper is only limited to the understanding of what part does SM or SNS play in recreating organizations, progressing careers of its members, providing learning and developing opportunities to prospective future candidates and so on, but further review is required to know how SM also poses challenges to its participants. For companies to decrease the adverse effects of SM sites, it is vital for Human Resource personnel to be informed and implement SM plans to be a part of the larger organization policies (Williams A LaVita 2017).

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# Impact of Spiritual Intelligence on Employee performance and Job satisfaction with reference to manufacturing industries – A review of important literature

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## **ABSTRACT**

*Spiritual intelligence (SI) plays a principal role in the well-being of a human being to understand and realize himself. SI helps the person to understand the integrated relationship between oneself and the world in which he is living. In manufacturing industries, an employee will be physically strained and mentally tired and cannot focus on his job. Employee performance and job satisfaction are important factors but many organizations are neglecting them. There are various tools and techniques for measuring employee performance and understanding the employee's job satisfaction level. The two main terms defined in this paper are, Spiritual climate, defined as integrating the employee's spirituality in the work environment and Presenteeism as the active presence of an employee in the workplace rather than their physical presence. This study identified the emphasis on establishing objectives, communicating them, planning and setting goals and achieving them, which are the steps of management by objectives. Emotional intelligence and Spiritual intelligence are the things that employees need to be aware of it to achieve success in their life. The spiritual climate is calculated using a spiritual climate survey and the Stanford presenteeism scale is used to measure work attendance. The results showed that Presenteeism and productivity are affected positively by spiritual climate. Emotional intelligence and spiritual intelligence have a positive and significant effect on job satisfaction and a partial positive and significant effect on employee performance.*

**Key words** – Spiritual Intelligence, Job satisfaction, Employee performance, Performance management, Manufacturing industries

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## **1. INTRODUCTION**

This paper is a review of the literature on the impact of spiritual intelligence on employee performance and job satisfaction. A study conducted by Ravichandran reviews that Spiritual Intelligence (SI) plays a principal role in the well-being of a human to understand and perceive himself. If an employee is satisfied in his job role, he performs well in an industry which leads to an increase in productivity (Ravichandran, 2015). Mahmood explored the knowledge of SI within the structure of Human Resource Development in manufacturing industries (Mahmood, 2018).

Mathews examined the importance of spiritual intelligence and stated that SI helps a person to understand the integrated relationship between oneself and the world in which he is living (Mathews, 2016). There are various SI principles to know whether the person is aware of SI and is adopting it into his life. When a person is satisfied in his job, he can perform well in an industry and maintains a balance between personal and professional life. There are different tools and techniques to measure performance and understand whether an employee is satisfied with his job (Pincus, 1986). In manufacturing industries, the employees' will be physically strained and even get tired mentally and can't be focused. So, practising SI helps a person to self-realization and to work happily in an industry.

*Fig. 1: Effect of factors of job satisfaction and spiritual intelligence in employee*



*performance*

After going through the literature, the author has obtained the above figure. Fig. 1 depicts the effect of job satisfaction factors and SI on employee performance. The factors considered in this review paper are job security, recognition, and good salary and some others are explained in fig. 4.

## **2. REVIEW OF LITERATURE**

During the literature review, SI and several job satisfaction factors have been found to affect employee performance in the industry. A few of them discussed by several authors are detailed below.

### **2.1 Spiritual Intelligence: Definition and its principles**

A study conducted by Anwar explored the interrelationship of SI and its subprinciples. Furthermore, it aimed at finding the effect of SI on the citizenship behaviour of employees working in service and manufacturing industries. Anwar et. al used multiple regression analysis techniques and found that the two dimensions playing a key role in developing citizenship behaviour of employees working in the manufacturing and service industries are transcendental awareness and critical existential thinking of SI (Anwar, 2015).

The main aim of the study carried out by Kulshrestha with his colleagues was to understand the effect of SI on educators' performance and job satisfaction. Kulshrestha et. al studied the advantages of having spirituality in the workplace and the benefits of

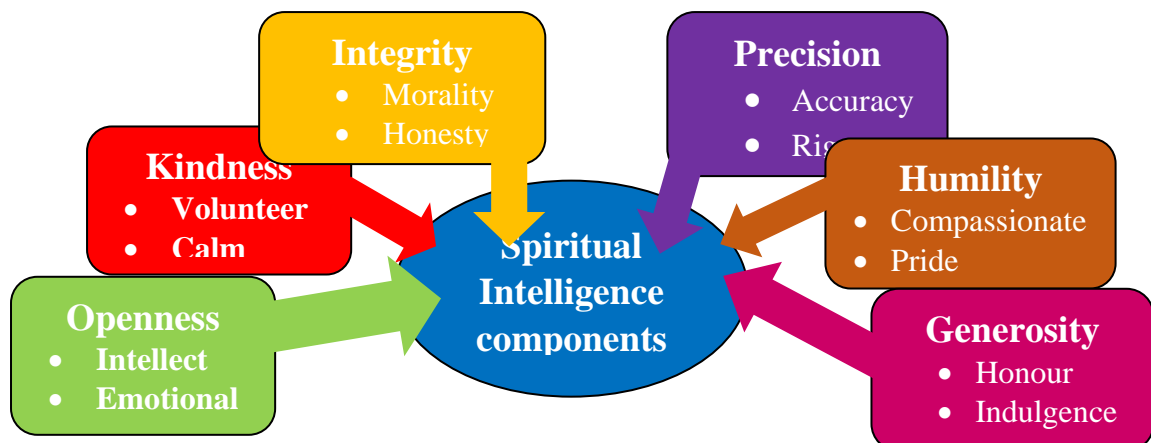
adopting spirituality in the workplace. They focused on giving training to teachers to incorporate spirituality (Kulshrestha, 2017).

Masitoh and Sudarma investigated the role of employee performance as a mediator on job satisfaction. With employee performance as an intervening variable, the study explored the effect of SI and emotional intelligence (EI) on job satisfaction. A probability sampling technique was used to collect the required samples for the study. They concluded by stating that EI and SI had a positive and significant effect on employee performance partially, and SI and EI had a positive and significant effect on job satisfaction. So, training needs to be included in the company to improve employee performance (Masitoh, 2019).

Tehubijuluw conducted the study in all developer business units. The data were analysed using the Structural Equation Method model. With this study, he proved that SI has a positive impact on job satisfaction and stated that employee productivity increases if employees were satisfied with their job. Spiritual intelligence enables people to understand the real meaning of life and helps to look at their business beyond their low-level life (Tehubijuluw, 2016).

In the study carried out by Seyed and his mates, they explored the relationship between spiritual intelligence and organizational commitment among employees. Seyed et. al made an analysis and found that there was a difference in the amount of organizational commitment and SI between males and females, which was higher in males (Kalantarkousheh, 2014).

**Fig. 2: Components of spiritual intelligence**



The author derived the above figure by referring to the literature. Fig. 2 depicts Spiritual Intelligence components that affect employee performance. Some of the components are Openness, Kindness, Integrity, Precision, Humility and Generosity.

**2.2 Employee Performance and its components**

Bouckennooghe et. al investigated the relationships between turnover and job performance and its effect on the traits of employees working in the organizations. To explain the relationship, they used Trait Activation Theory. The data supported their hypotheses and to understand the contingent level of the relationship, the authors used the Multiple Regression model. Furthermore, the findings and implications of the research were discussed in detail (Bouckennooghe, 2013).

The study led by Carmeli and Freund explored the relationships between group work commitment, job performance and job satisfaction of lawyers employed in private firms. Their relationships were tested based on Morrow’s concept of five universal forms. They showed that the relationship was supported by Randall and Cote’s commitment model. Moreover, job satisfaction has a mediating role between job performance and group work commitment (Carmeli, 2003).

Loan studied the effect of organizational commitment on employees' performance in the West with job satisfaction as an arbitrator. He developed four hypotheses in which the first three were based on the relationship between job performance, organizational commitment and job satisfaction and the last was regarding job satisfaction as a mediator. With the analysis made by him, the result supported all the hypotheses. Furthermore, he suggested that for better employee performance, only the positive result about the relationship between job performance and organizational commitment is not sufficient, rather the job satisfaction factors need to be improved in an organization (Loan, 2020).

Korazija et al. reviewed the relationship between SI and job satisfaction among employees and leaders. They investigated the relationship and found that when SI is higher, then job satisfaction is higher. Additionally, there is a positive relationship between SI and work satisfaction among employees and there is no significant relationship between SI and work satisfaction among leaders (Korazija, 2016).

Jena focused on finding the effect of spirituality at the workplace on employee performance with Organizational Citizenship Behaviour (OCB) as a mediating role and employees' EI as the moderator. Nowadays, in this business world, employee performance is very important, but it has been neglected by many organizations. Jena conducted this study with an analytical and cross-sectional approach. The results showed that employees' performance has a positive linkage with workplace spirituality and OCB is positively allied with spirituality in the workplace and the performance of an employee (Jena, 2021).

**Fig. 3: Components of employee performance**



The author has obtained the above figure after going through the literature. Fig. 3 describes the components of employee performance to be measured. Various components which are measured through performance appraisal tools are workplace spirituality, training, motivation, job satisfaction, work commitment, and organizational culture. This paper focused on these components that were affected by spiritual intelligence and job satisfaction.

### **2.3 Job Satisfaction: Factors and Consequences on Employee Performance**

The study conducted by Krisnanda and Surya aimed at exploring the effect of SI and EI on transformational leadership. The respondents of this research were contract employees. EI and SI are the two things that the employee needs to be aware of to achieve success in his life. In this study, they used a questionnaire to collect data from employees. The collected data were analysed using the Sobel test and path analysis. The outcome of the study was SI and EI had a positive effect on transformational leadership and a significant impact on employee performance (Krisnanda. P.H., 2019).

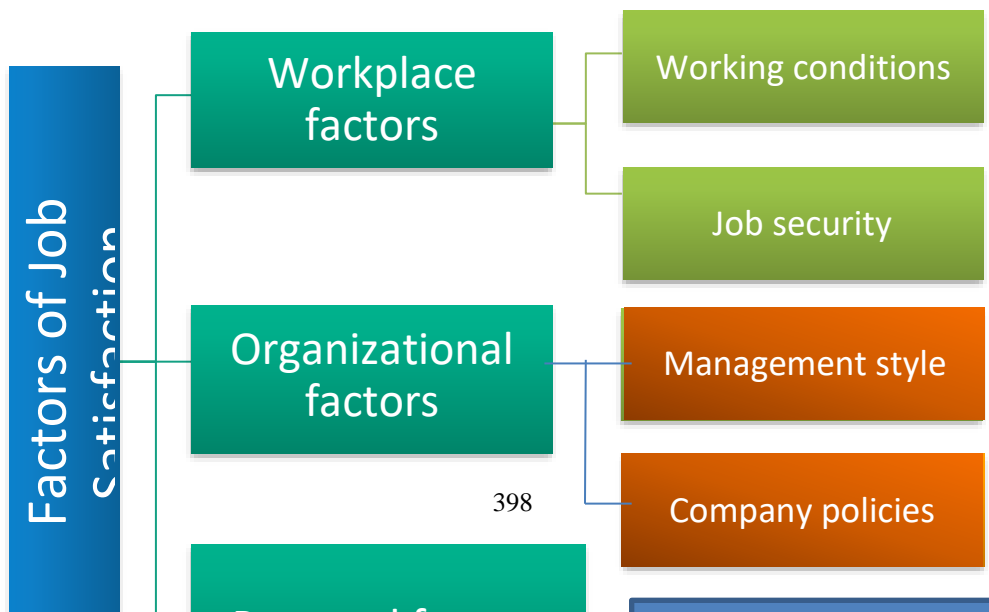
Yektae et. al evaluated the impact of SI on employees' job performance. To compute the variable of SI, they took the opinions of various experts and achieved seven main indicators. Compared to other structures like the EI structure and Intellectual Intelligence (II) structure, the SI structure is the complete one and influences other bits of intelligence. The questionnaire was made and distributed among the respondents to collect the data. The structure of SI is more complete than the structures of II and EI, so it has control over the other bits of intelligence (Yektae, 2016).

Al Eid et. al conducted a study which aimed to find the skills and the religiousness factors affecting performance. The analysis was qualitative so the data were collected by interviewing the employees. The data were coded and classified into three axes: SI skills of leaders, factors affecting leaders' SI, and the impact of leaders' SI on performance. They disclosed that there are five SI skills of leader factors that have an impact on the SI of a leader. Furthermore, to increase productivity, to solve leadership problems, they suggested acquainting important SI skills for the workers and the leaders (Al Eid, 2020).

Supriyanto et. al explained the aspect of work satisfaction and OCB to arbitrate the impact of spiritual leadership on employees' job performance. As it was explanatory research, they collected data using questionnaires from the employees. For the analysis of data, the Partial Least Square method was used. They found that Employee performance was not influenced by Spiritual leadership, but the mediator OCB plays a role (Supriyanto, 2020).

As though some models uphold more than others, the research did not give conclusive confirmation due to the lack of past information while reviewing the literature. This study gave a brief explanation of the relationship between job satisfaction and job performance. Judge et. al provided both the quantitative and qualitative review for this study, where seven models were identified to define the past research on the relationship between job performance and job satisfaction. A new meta-analysis was carried out by testing these models, but the perfect relationship was not depicted, so additionally, further research was suggested (Judge, 2001).

**Fig. 4: Factors of job satisfaction**



The author has obtained figure 4 after going through the literature. The above figure illustrated the factors of job satisfaction in detail. The factors are broadly categorised into workplace factors, organizational factors and personal factors. The workplace factors are further classified into working conditions and job security, organizational factor into management style and company policies and then personal factors into Flexi-work hours and good salary.

#### **2.4 Performance Management System: Definition, its components and appraisal tools**

The study conducted by Mishra and Farooqi spotlighted performance management impacting employee satisfaction in the IT industry. In IT companies, talented workers were asked frequently to look into the various goals and projects at the same time. They focused on performance management's major dimensions to explore the relationship between the work satisfactions of the employees. The authors investigated and found the difficulties faced by the employees when the performance management system was implemented (Mishra, 2013).

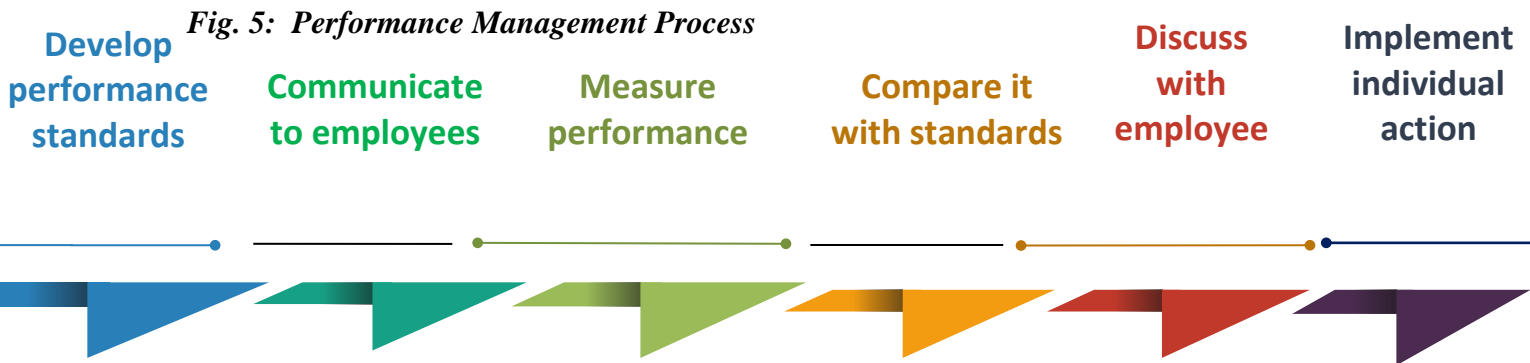
Hendri aimed in finding the impact of organizational learning on work satisfaction and job performance of an employee. He explored the study using the Partial Least Square approach and the proportional random sampling method was used to analyse the data collected. The result showed that learning organization has a positive impact on organizational commitment and job satisfaction but it has no significant impact on employee performance (Hendri, 2019).

Decramer et. al explained the interrelationship by getting an integrated study about higher institutions and performance management systems. This study focused on features of the performance management system and explored the interrelationship with work satisfaction. There are various tools to measure the performance of an employee in an institution. They found if the performance management system of an employee is at a high level, the satisfaction of an employee is associated with high communication. Furthermore, they added that employee satisfaction builds upon tenure and the diversified policy of performance management must be adopted in various universities (Decramer, 2013).

The study led by Kampkötter aimed at explaining the formal appraisal techniques to measure the performance of an employee. He detailed the various formal appraisal techniques and analysed their impact on employees' work satisfaction. The study differentiated the appraisal associated with monetary benefits and non-monetary benefits. The result showed that there is a positive relationship between performance appraisal and job satisfaction which is induced by monetary outcomes. Furthermore, theoretical and practical implications are analysed and stated that the monetary outcomes related to performance appraisal were a strong human resource management tool (Kampkötter, 2017).

Islami and Mustafa focused on the Management by Objectives (MBO) technique of performance appraisal to measure the employees' performance. They prepared the questionnaire to collect the data, and data were analysed using SPSS software. Additionally, they identified the emphasis on establishing objectives, communicating

them, planning and setting the goals, and achieving the goals by employees are the steps of MBO. Furthermore, to measure the performance of an employee, the MBO method was used as it is an effective method of performance appraisal (Islami, 2018).



The above figure has been derived by the author from the review of the literature. Fig. 5 gives the performance management process in brief. To measure the employees' performance, there are six steps to be followed. The initial step is to develop the performance standards, and then communicate them to the employees. Then measure the performance and compare it with the standards set at the beginning. Discuss it with the employee and then implement the individual action.

## 2.5 Employees' Job Performance at manufacturing industries

Mehta and Rajan analysed the factors that affect the manufacturing sector. This research aimed to study the current strategies implemented in manufacturing firms. Some of the factors were reaching environmental standards, better infrastructure and compliance with tax & labour laws. They suggested that the logistic sector can be reformed in the manufacturing firms to improve the condition of the manufacturing hub. Additionally, they stated that, for the development of the country, the government is funding various sectors, such as roads, building bridges, rails, and good infrastructures (Mehta, 2017).

Khandan et. al defined the term spiritual climate as an Employee's perception of spirituality in all aspects of organization management and presenteeism as employees' active presence in the workplace, rather than their mere physical presence. The following paper aimed to centre the spiritual climate and presenteeism and their interrelationship. The spiritual climate was calculated using Spiritual Climate Survey and the Stanford Presenteeism scale was used to measure work attendance. Furthermore, the results showed that spiritual climate has a positive effect on presenteeism and productivity (Khandan, 2019).

Pradhan and Jena examined the aspect of spirituality in the workplace with the factors of organizational commitment and employee engagement in the job behaviour of an employee. This paper made a detailed empirical investigation of manufacturing organizations and the effect of workplace spirituality on the job behaviour of an employee. Job behaviour of an employee will be effective when there will be convenient work environment which helps in the career growth of an employee and also increases productivity (Pradhan, 2016).

A study conducted by Na-Nan et. al focused to criticize job satisfaction, employee engagement and organizational commitment through the indirect and direct impact of self-efficacy on OCB that is transferred through organizational commitment, employee engagement and job satisfaction. They used the instruments used by earlier researchers to



get the questionnaire. They got the results as OCB has a direct impact on self-efficacy. The developed model was related to the self-efficacy theory to convey OCB (Na-Nan, 2021).

Ibrahim explored the effect of autonomy and organizational justice on the retention of an employee in the manufacturing industry. He surveyed to investigate job satisfaction as an arbitrator between the interrelationship of autonomy and organizational justice. The data were analysed through SPSS. The study found that retaining a good employee is an important aspect of the industry to increase productivity of the industry. They concluded by stating that the industry can handle the situation better and retain employees (Ibrahim, 2021).

**Fig. 6: Performance Appraisal Tools and Technique**

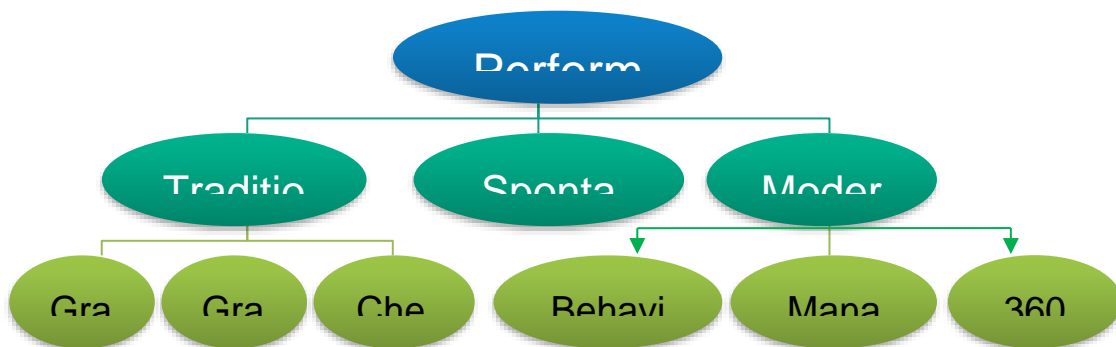


Figure 6 has been obtained by the author by going through the literature. Fig.6 outlines the performance appraisal tool and techniques. To measure the performance of an employee, there are 3 methods, such as Traditional method, the Spontaneous appraisal method and the Modern method. Some of the techniques under the traditional method are the Grading method, Graphic rating scales and Checklist method. Modern method techniques are a Behaviourally anchored rating scale, MBO and 360 degree feedback. Modern methods are considered to be the most effective methods to measure performance in most organizations.

### 3. CONCLUSION

From the above study, the following becomes clear: workplace spirituality plays a major part in increasing productivity and keeping an employee engaged in the manufacturing industry. Spiritual intelligence has a positive influence on employees' performance and job satisfaction. For measuring performance, modern methods of performance appraisal are used, especially the MBO method is used, as it is an effective method of performance appraisal. This study concludes with suggestions for further investigation regarding the relationships between job performance and work commitment principles. Additionally, to induce the spirit of organizational citizenship behaviour among the employees and develop the appropriate dimensions of spiritual intelligence, organizational management needs to make suitable decisions. Furthermore, to increase productivity and solve leadership problems, it is necessary to make aware of the importance of SI skills to the workers and leaders by providing training in the industry.

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# Great Place to Work

**Shimmy Francis**

## **ABSTRACT**

**Purpose:** *Employer branding is a long-standing concept that promotes the organization to attract potential employees. The aim of the paper is to know what makes the employer a great place to work and the benefits of a great place to work.*

**Methodology:** *This article is based on previous literature, survey results, and a review of academic employer branding models.*

**Findings:** *It is found that trust, engagement, transparency, communication, and intention are the characteristics to make a great place to work. Potential employees prefer the channel of a great place to work. This study presents the conceptual study of the great place to work.*

**Practical Implications:** *This study allows employers to make their strategies for employer branding. It benefits prospective employees as well.*

**Originality:** *This study provides valuable inputs for formulating employer branding strategies. The conceptual model on the Great place to work is the study's novelty.*

**Keyword:** Employer branding, Great place to work, Organisation Attractiveness, Brand, Signalling Theory

**Paper type:** Conceptual paper

# Recouping Organizational After Post Covid Pandemic: Analyzing Employee Engagement in Workplace

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## **Abstract:**

*Since the 1990s, employee engagement has been an element of management philosophy widely adopted in research from the 2000s. Employee engagement is employees' emotional effort to complete the task with passion and motivation in the workplace. During the Covid 19 pandemic, the situation drastically changed organizational and workplace scenarios and affected the organizations badly. The paper aims to understand the significant challenges faced by employees to keep them motivated during the covid 19 pandemic and even after post covid 19 different waves. Focus on how the Organization can reinvest their employees in the workplace with the hybrid mode of work culture. This paper emphasizes secondary data during covid 19 pandemic articles and reports on employee engagement since 2000. The expected result of employee engagement after the covid 19 pandemic is to provide strong support for employees regarding their workplace environment, keep motivating them, and allow employees to work from the Hybrid mode, which, for most people, is a very convenient method of working. It is the most challenging time for every Organization to recoup themselves from the covid 19 pandemic crisis; it provides a real-time practical implication and insight on how to recoup organizations and employees from internal/external concerns faced during Covid 19. This paper prioritizes Covid 19 effect on Employee engagement and Recouping Employees at Workplace in Hybrid mode.*

**Keywords:** Organizational, Hybrid work mode, COVID-19, Employee Engagement, Workplace, Development, Virtual platform

## **1. Introduction**

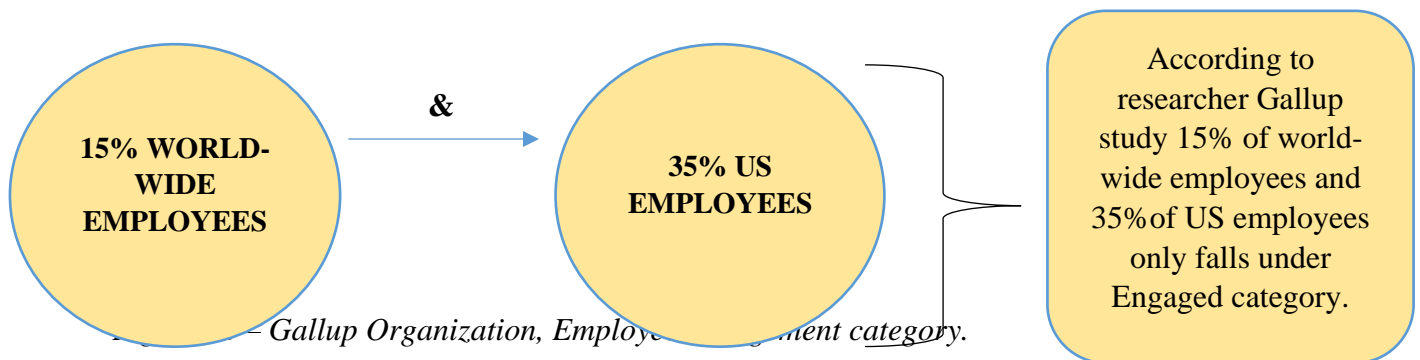
The covid 19 pandemic changed the lifestyle of people and organizational set-ups. As a result, its employees and Organization found new developing ways for faster growth of the Organization in a cooperative world. Due to the pandemic, workplaces moved towards virtual platforms, and employees suddenly faced many changes and challenges in collaborating with businesses for work-life balance. So critical employee engagement during covid 19 made it very challenging for an organization to restore their managerial and clerical work to bring effective and efficient results. Employees moved to online workplace mode and later became Hybrid mode. So, the effectiveness and efficiency of employees were reduced, and they were not motivated to work at offices, less workplace system. Employees faced many challenges to overcome this situation. For restoring their business, Employee engagement plays a significant role. Employee engagement positively fulfils the needs and motivates employees toward their goals.

Millions of employees worldwide and organizations shifted to virtual platforms due to this pandemic to run their businesses even during difficult times. Hence, organizations worked nights to adapt to the changing environment. When covid situation begins to threaten businesses, higher officials start fearing how employees will handle the business. Many organizations cope-up with the problem and manage it, and companies begin to run normally. But most organizations found it difficult, and their growth declined. Many employees wrote their resignation letters due to no change for the company, and the company was shut down. In this situation, employees were less motivated towards their duties; they worked from home, so many were business with family workers. Postpended the company work and studies involving family life rather than a business. So, employees find it challenging to balance their family and professional lives.

## 2. Literature Review

### 2.1 Employee Engagement

Employee Engagement drives enthusiasm in employees towards their jobs, provides better communication, and encourages teamwork. Consequently, the Organization has higher performance and productivity. In addition, employee engagement is often characterized by a strong emotional attachment to their work and increased motivation and commitment toward the Organization's goals.



Bakker and Leiter (2010) also emphasized the importance of employee engagement by asserting that business organizations require active and devoted employees, i.e., individuals interested in their workplace and job. An analysis of the literature reveals that employees with family responsibilities are deviating from office work and are unable to collaborate or communicate with co-workers. Employee engagement means people are maximizing their value to the Organization. There is a high level of employee engagement among employees who are not engaged much in family work or who have more freedom and proper sleeping habits. People who are distracted in their sleep face significant issues in their work, like reduced productivity, psychological strains, and demotivating. Macey et al. (2009) According to the study, engagement is defined as behaviours such as flexibility, perseverance, engagement, and initiative, but not commitment or citizenship. Macey & Schneider (2008) provide a set of claims concerning the psychological state of engagement, trait engagement and behavioural engagement. Gallup organization categorized employees into three categories based on employee engagement: engaged, not engaged, and actively disengaged.

Table No: 1 Definition of Employee Engagement given by different Authors.

Kahn (1990)	Personal engagement is "the simultaneous employment and manifestation of a person's "preferred self in task behaviours that encourage connections to work and others, personal presence, and active complete role performances."
Kahn & Heaphy, 2014	Employee engagement has piqued the interest of practice and research worldwide as businesses understand the beneficial and competitive advantages engaged employees to provide.
Mahipalan, M., & Sheena. (2015)	Increased employee engagement ensures improved productivity, customer happiness, increased sales, higher profitability, and long-term goodwill. In summary, employee engagement is critical for both employees and organizations.
(Robinson et al., 2004).	Employees who are engaged have a positive attitude toward the Organization's products and services and the entity itself. The work they do, and respect for other members of the group. Desire to work well in a team, manage to keep knowledge up to date, trust in opportunities for growth and development, a venture creation attitude, focusing not only on their responsibilities but also on the company's larger vision, and aim to take on other responsibilities.
Andrew & Sofian, 2012; Saks, 2006.	Employee engagement may be utilized as a connection to develop employees' attitudes, intentions, and behaviour toward enhanced work engagement.
Bedarkar and Pandita (2014)	A complete paradigm of employee involvement was proposed. The researcher found that the key drivers of employee engagement are the governance of work, interaction with co-workers, and work-life balance.
Jena, Pradhan, & Panigrahy, 2018.	Engaged employees are always positive, have a strong interpersonal connection with one another, and work well in the Organization.
Schaufeli et al. (2002)	Engagement is a "positive, rewarding, work-related state of mind marked by vitality, dedication, and concentration."
Wellins and Concelman (2004)	According to one expert, employee engagement is the invisible factor that encourages people to better achievement standards.

## 2.2 Employee Engagement Levels:

Employee engagement is typically defined as an internal state of mind comprising the emotional, physical, and mental aspects of an employee's dedication, satisfaction, commitment, and effort, Chanana (2020). There is a model developed by Blessing White Organization regarding five levels of Employee Engagement. This model mainly talks about the contribution level of employees at an organization and satisfaction. In addition, employee engagement is linked to individual participation and fulfilment, as well as excitement for work, according to the delight–engagement method—Harter (2002).

- **The Engaged:** High contribution and High Satisfaction

The employee focuses on the functionality and performance activities. Organization and works towards the attainment of the Organization. So, they provide high productivity, effort, and commitment to their work.

- **Almost Engaged: Medium** to High contribution and satisfaction

An employee who performs highly is not much satisfied with the work done by them. However, as an organization motivates them to do their job because they are engaged in work, they will give their full potential to it.

- **Honeymooner & Hamster:** Medium to High Satisfaction and low contribution

The employees who joined work newly or were assigned the task recently may not know the functionality of the work they do so that they will feel satisfied and happy, but their contributions will be significantly less. So, hamsters are people who may work hard, but their work is not essential. So they will feel satisfied, but they are not contributing anything to the Organization.

- **Crash Burners:** Medium to High contribution and low satisfaction

Employees who work hard for the Organization may not find consistency in their work, so they may not feel satisfied. As a result, this employee takes the wrong decision to move out because of low satisfaction.

- **Disengaged:** Low to medium level of contribution and satisfaction

A most disengaged employee. High level of discontentment and disruption towards the workplace. Some organizations may demotivate employees and pull them down in their work instead of encouraging and motivating them.

### 2.3 Covid 19

Novel Coronavirus is a disease spread out from Wuhan lab, China. A virus spreads out several respiratory disorders. Many people globally have been affected by these pandemic diseases since 2019. Due to these pandemics, diseases spread quickly and took many people's lives. Suddenly people moved out of offices and stayed at home. During that time, cooperative world productivity decreased, and all businesses went down. Many organizations started a virtual workplace ecosystem for their employees because of a month-long shutdown of industries. Employees did not have any other option instead of moving to virtual platforms. Many people who did their clerical work at offices lost their jobs. Even employees face difficulty in an online working platform due to internet issues, inability to concentrate on office work, work from home climate isn't suitable for an office setting, and even they were unable to manage work-life balance. The employees were less motivated and not able to give any effort to the work they were doing. Employees' engagement went down, and the work efficiency was not good enough to meet their target. Two years later, the pandemic spread, developed a vaccination, and people got vaccinated and started to move out; people were mentally occupied with overcoming these epidemic



diseases. To recoup from that situation organization started implementing many methods like WFH, a Virtual Platform created after a Hybrid mode workplace environment. This paper focuses on how people came out of the pandemic and how the Organization keeps motivated and engaged employees. Employee engagement is crucial for an organization's valuable personnel to be retained. An organization must make optimal use of its human resources. An organization cannot thrive for long without employee involvement (Chanana. et al.,2020).

### **3. Objective of the Study**

This research examines employees' primary problems staying motivated during and after the covid 19 epidemic, 3rd wave. Focus on how an organization can reinvest their employee in the workplace within the Hybrid mode of work culture—this paper priority secondary articles emphasizing employee engagement-related pieces.

1. To identify how to manage Employee engagement during covid 19 pandemic
2. To identify factors influencing Employee engagement, covid 19 and Hybrid mode workplace ecosystem.
3. Analysis of various opportunities to develop Employee engagement after post covid and recouping Organization s

### **4. Research Gap and Problem**

In recent decades, **TREMENDOUS CHANGES** and challenges happened in organizations. They adopted many methods like working remotely, virtual workplace systems, and hybrid workplaces to overcome this. However, the newly adopted working system lacks the knowledge gap in the literature review of Employee engagement in online or remote working systems and traditional office ecosystems. Employees faced difficulties in communication and collaboration within virtual platforms. In an organization, Employee engagement plays a vital role. During the epidemic, the Organization cannot concentrate on employee and their welfare. Even organizations were going through the most challenging time of the global era.

Lack of communication

Challenges faced for onboarding of employees

Demotivation towards work

Relaxation in operating work and productivity

### **5. Research Methodology**

This theoretical paper is based on secondary data like a research paper, articles, the WHO website, blogs, and company reports of the last few years. The form provides insight into employee engagement for the last two or three years. Now, organizations emerged from all the epidemic challenges, and employees started to come to the office. According to the study conducted by the American Management Association survey during covid 19 pandemic report says that more than 70 per cent of employees have started to work remotely. There is a drastic increase in online business, and much development happened in online platforms

## 6. Theoretical Framework

This study explores the extension of the literature review related to employee engagement; covid 19 pandemic affected the ecosystem of Organizations and recouping. It aims to bring a new perspective to Organizations and maintain employees after post covid pandemic situation. Because of the quick rate of change in most businesses, internal communicators must implement a paradigm shift in the approach to internal communication with workers. Employee communication must be founded on a compelling narrative, engage management, and assure employee voice and integrity. Solutions can be identified when employees can speak their ideas and suggestions on virtual platforms. The values of a company are an implied message that boosts employee motivation. A healthy workplace prioritizes employees' physical, spiritual, environmental, mental, occupational, intellectual and emotional wellness. Employees must be engaged in their job to be productive and successful. Organizations may improve their employees' health to make them more effective. Changing work environments and interacting with co-workers simultaneously produce a sense that previously employed work tactics are inadequate, necessitating the need to experiment with new strategies and making work difficult. Since the home setting is not conducive to a professional career, it produces several problems, including the need for immediate communication with colleagues, working conditions, internet connection speed, and equipment quality, all of which create stress. So, organizations provide both online and offline modes of workplace ecosystem.

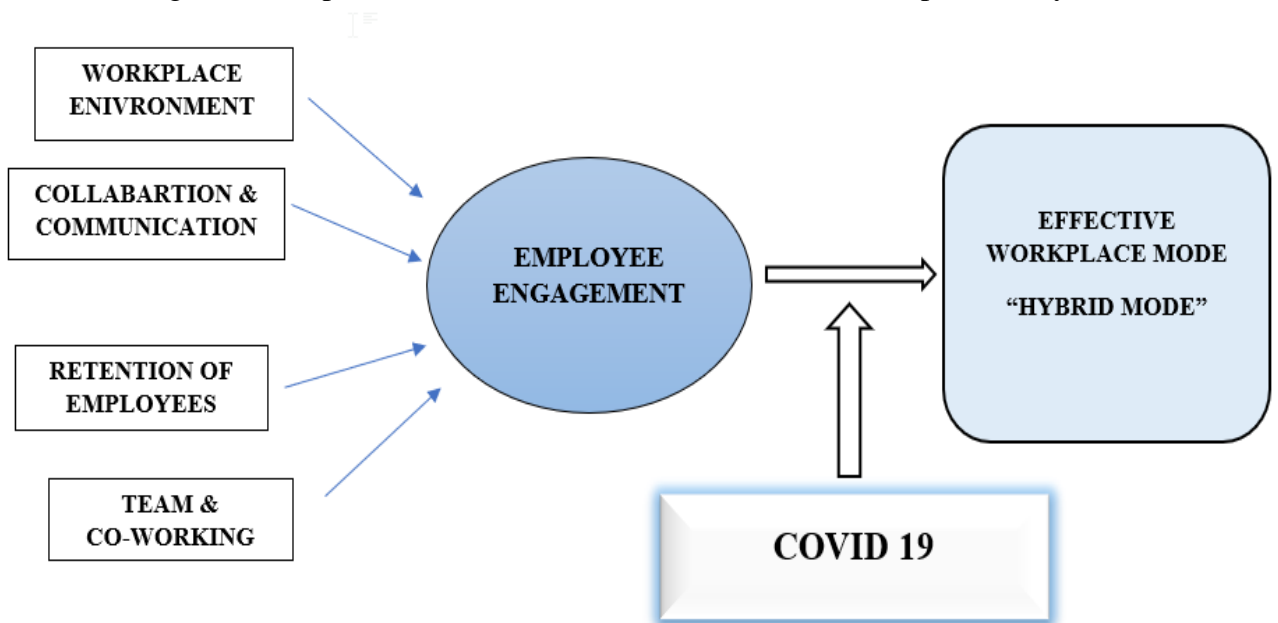


Fig No: 2 Theoretical Framework for E.E. during COVID-19 in the workplace.

### 6.1 Employee Engagement Affected Employee During Covid-19 Pandemic:

The Organization faces tremendous changes during an epidemic where employees are working remotely. It affected the psychological mindset of employees and even organizations that could not keep employees engaged. The researcher (Mani and Mishra, 2020) says that covid 19 organizations should have kept their employees motivated and engaged in activities. Müller-Nedebock (2020), one of the essential things for staff during the 2020 epidemic has been an employer who gives assistance and consistency to their employees throughout the pandemic. The epidemic has also emphasized the necessity of

companies fulfilling their employees' commitment to caring for them, which implies that it is becoming increasingly crucial to focus on the EVP. Universum (2020) recommends that managers pay greater attention to three critical elements to guarantee their staff keeps up with the changes, is not overwhelmed by them, and remains engaged with the Organization in light of the coronavirus pandemic. These are the essential points: • Clear and consistent communication is required for transparency; • Support virtual and remote work to maintain meeting effectiveness; and • Evaluate and upgrade technology tools as needed. Employee engagement is critical for an organization's growth and development, leading to increased productivity. Therefore, employee involvement is vital for organizational operations during the pandemic, and organizations should encourage employee engagement. According to Kaushik (2020), the COVID-19 pandemic has mandated more employee engagement and support for an organization's survival and success. Employee participation is essential at times of crisis, such as the COVID-19 pandemic, which produced significant changes in the functioning of individuals and communities worldwide as a novel and unprecedented scenario (Borucka and Lagowska, 2020). According to Sarkar (2020), a new component incorporated by businesses in employee engagement is family engagement, which keeps employees' children occupied for a few hours while their parents work from home during the COVID-19 lockdown. Employees who improved their work participation during the COVID-19 epidemic recognized their business's social and economic advantages. As a result, the findings show that more organizational assistance during disturbance will lead to greater employee engagement at work.

## **7. Discussion & Finding**

During covid 19, new ways of work culture have been created, and the concept of a Hybrid mode has developed where an employee can work virtual and office ecosystem. Moreover, the usage of networking platforms has been developed. In the initial days, employees faced many changes and challenges. Gradually they feel safe and secure with work and family. Massive communication and collaboration were noted in the earlier stages of the pandemic. Employees were less engaged in their office work rather than concentrated on family life. An employee who is involved well in the Organization will have higher productivity; they will feel reasonable employee satisfaction and aim for the development of the Organization.

The findings indicate that employee engagement is more critical than continuance commitment in this connection, implying that employee engagement is more powerful.

Significant changes happened in the Organization:

1. Technological advancement
2. Setting a new standard of working culture
3. Space of creativity and innovation expanded
4. Provided counselling and motivation given to employees
5. On-the-job training facilities are offered.

## **8. Managerial Implication**

Many organizations fall in their performance during epidemics. The Organization was not able to recoup from the situation. To reinforcement of employee engagement, the Organization adopted more innovative methods to ensure the performance ability of

employees. Employers should adopt innovative and creative employee engagement practices to keep employees motivated, stimulated, committed, satisfied, and blissful during this challenging time. Engaging employee is an ability of an excellent leader to provide the proper work environment to work with enthusiasm and passion. Covid 19 pandemic helped many people to move online platforms; organizations helped employees to learn the software. Employee behaviour has shifted due to the COVID-19 pandemic's impact on the workplace and organizational operations. As a result, identifying the organizational behaviour of the employees in this circumstance is a critical scenario.

## 9. Conclusion

A comprehensive literature review is conducted in this paper on employee engagement, covid 19, and recouping of organizations. If employees are engaged in the Organization, employee performance will increase to a high level of satisfaction and productivity. When covid 19 pandemic created a thread in the Organization, they took new steps to move out from the pandemic and re-start their work in virtual platforms and hybrid mode. In the earlier stages of the pandemic, the employee faced difficulty in communication and collaboration with a co-worker, so they adopted a virtual system. To develop the Organization's function, give employees a voice to provide suggestions, ideas, and decision-making power for a better work culture system during in covid 19. So, employees feel enthusiasm towards their job and Organization. Due to the constant evolution of the business workplace, leaders must constantly reinvest in their company culture. Many continue the cultural initiatives they adopted before and during a pandemic, while others may evolve or disappear. Nowadays, many companies are creating a variety of employee engagement practices, such as virtual team meetings, virtual learning and development, weekly alignment online sessions, webinars with industry experts, and webinars for anxiety and stress, as well as online team building activities, online family engagement practices, and brainstorming exercises.

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## Data Analytics- An emerging skill gap

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### **Abstract**

*With rapid technological disruption and gradually increasing information at fingertips, Industries are looking for more and more data analytics skilled youth. Today, Successful companies are using predictability and advanced analytics to differentiate themselves in the market place. They are increasingly dependent on data-driven analytics tools and data-led insights to help make informed decisions, solve business problems and most importantly*

*stay relevant in an increasingly evolving and competitive market and are able to stay ahead of the market. Further Covid-19 has disrupted the way of doing business, education across the world. To survive the topsy-turvy transformative era, companies have become even more*

*reliant on analytics practitioners, data savvy business leaders and consultants who know how to respond and lead the changes when it comes to solving data-driven business challenges,*

*offering innovative data-led solutions and ultimately appreciating the impact of the current situation which addresses trending needs and the new age lifestyles.*

*However, the lagging skill gap has become the limiting factor. There by leading to a high demand for not only at the post graduate level but also at the graduate level. There is an urgency to start courses at graduation level due to deep gap in the available skill sets.*

*This paper will highlight the dip-stick study on the need for data analytics skills in Bangalore's job market. Will address 15 companies and it's need for data analytics skills at the graduation skills. The paper will address skill types, mode of learning, why it is needed in today's market, and future growth prospects of the skills. The paper will also understand the work done by Information & Technology Sector, the various curriculum offered by Higher Educational Institutions and what is needed. The work will be beneficial to educators considering improvement of the curriculum for Data Analytics skills and to students desiring a more contemporary program. The paper can be referred by Institutions to promote need- based curriculum through innovative pedagogy to disseminate the future skills.*

**Key Words:** Data Analytics, Curricula, Pedagogy, Higher Education, Data Science, Future skills

# A Study on the Impact of Employer-Employee Relationship on Employee Performance with reference to Select Manufacturing Companies in Dakshina Kannada

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## **Abstract**

*The study on the “Impact of employer-employee relationship on employee performance with reference to select manufacturing companies in Dakshina Kannada” throws light on the impact of the employer-employee relationship on the employees' growth, performance, and satisfaction in the organization. It also highlights the key factors from the employer that influence the performance of employees in the organization. The time period of the study was 6 weeks, sampling technique used was random sampling with sample size of 100 respondents of select manufacturing units and the statistical tool used for the study is Chi-square test.*

## **Keywords**

*Employer, employee, relationship, performance, key factors*

## **1 Introduction**

Being one of the key components of the organization, employees play a vital role in the success as well as the failure of the firm. Nowadays managing employees in the workplace has gained its own importance and stays as one of the top priorities of management. The employer-employee relationship is an effort of the organization to build a scene of togetherness at the workplace and to improve cooperation and mutual respect between employer and employees of the firm.

The specific attention and addressing of problems and need of the human resource of the organization could bring a drastic change in employees' performance at the workplace. It is Employers and management who need to motivate the workforce and make some efforts to keep up the morale of their employees, which in turn leads to the better performance of employees and the achievement of company's objectives in the long run.

## **2. Objectives of the study**

1. To find out the key factors that have an impact on employer-employee relations at the workplace.
2. To study the impact of the employer-employee relationship on employee performance.

## **3. Scope of the study**

The scope of this topic has wide coverage as it provides an opportunity for studying various key factors that act as driving forces in having a good employee-employer relationship in the organizations under study. This study offers a detailed view regarding the problems, difficulties that arise in the organizations for establishing effective employee relations and denotes what is employee-management relationship from employee perspective and how it impacts employee performance. Scope of the study is restricted to select manufacturing companies in Dakshina Kannada

## **4. Methodology of the study**

### **4.1 Primary data**

Present Study is descriptive research by means of Questionnaire based study to identify the responses of employees from select manufacturing units in Dakshina Kannada towards employee-employer relationship on employee performance.

### **4.2 Hypothesis**

Null Hypothesis (H<sub>0</sub>): There is no impact of employer-employee relationship on employee performance.

Alternative Hypothesis (H<sub>1</sub>): There is an impact of employer-employee relationship on employee performance.

## **5. Theoretical background of the study**

The employer-employee relationship simply refers to establishing and managing a mutually respectful association between the employer and employees of the organization. To develop a positive relationship with the latter, the former needs to play a predominant role and should support employees with whatever capacity required in the organization.

The employer-employee relationship is a dynamic topic in human resource management that is affected by factors like legal and economic policies of the firm, organizational culture, Technological changes in the workplace, managerial behavior towards workers, different kinds of leadership styles, etc. Relationship between employer and employees largely impacts organizational culture, employee satisfaction, and more importantly Attrition rates of the company. To understand how employer-employee relations impact the performance of employees and growth of the organization, understanding factors like salary, bonus, incentives, rewards, and non-monetary aspects like motivation, word of appreciation, level of autonomy, etc. play a crucial role.



## 6. Literature review

1. **Md. Sahedur Rahman (2021)** His study reveals that the employee-employer relationship helps employees in accomplishing their tasks and targets. It creates an effective communication channel and develops a competitive advantage for the company.
2. **Dr. K. R. Subramanian (2017)** This study is focused on the role of the generation gap and its effect on the employer-employee relationship in organizations. The author here highlights the need for the generation gap as they help to bring diversity.
3. **Sumesh Raizada (2019)** He states that the employer-employee relationship acts as management philosophy as well as strategy and is very crucial for the success of any organization.
4. **Kavyashree M B (2021)** The author here mainly focused on the impact of the employer-employees' relationship on the performance of employees and found that it acts as a crucial part of achieving desired objectives.
5. **Omur Hakan Kuzu and Derya Ozilhan Ozbey (2014)** Both the Authors here state that the employer-employee relationship acts as a crucial element for establishing an organization against its competitors.

## 7. Data analysis and interpretation

### 7.1 Determining the factors from the employer which have a high impact on employees' performance

#### Table showing factors from employer which impact employee's performance

5 = Very high impact, 4 = High impact, 3 = Average impact, 2 = Low impact, 1 = Very low impact

#### Analysis:

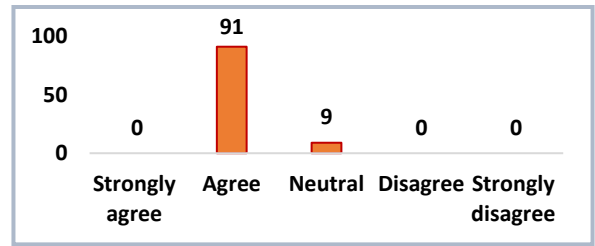
From the above table, we can understand that salary; bonus and incentives are the factors that have a huge impact on employee's performance followed by breaks, leaves, equality, and communication. However, the rest of the factors do have an impact but comparatively less than the above-mentioned factors.

Sl. No.	Factors	5	4	3	2	1	Total
1	Salary, Bonus, and Incentives	63	21	11	5	0	100
2	Motivation	5	35	60	0	0	100
3	Communication	28	47	25	0	0	100
4	Feedback	8	51	38	3	0	100
5	Off the job training	0	52	30	14	4	100
6	Recognition and Appreciation	6	8	86	0	0	100
7	Attention for career goals	5	10	85	0	0	100
8	Trust	9	72	19	0	0	100
9	Equality	37	45	18	0	0	100
10	Breaks and Leaves	53	35	12	0	0	100

### 7.2 Analysis of employee's participation in decision making process of the organization

Chart showing rate of employee’s participation in decision making process of the organization

Analysis: Above data states that most of respondents agree that employer allow them to take part in decision making process of the company. Thus, we can understand that employer allow employees to participate and decide about crucial aspects of the organizations which helps motivate employees and increase their performance and also trust in their employer.



### 7.3 Analysis of employee’s response to “good employer-employee relationship improves employee performance”

Table showing employees' opinion about “good employer-employee relationship improves employee performance”

#### Analysis:

The above-presented data indicates that the maximum number of employees strongly agree that good employer-employee relations help to improve their performance. Thus, it states that a good employer-employee relationship has a positive impact on employees’ performance and influences their work and which finally contribute to the growth of organization in the long run, as employees are always considered as the prime asset of the company.

Response	No. of Respondents	Percentage
Strongly agree	67	67
Agree	28	28
Neutral	05	05
Disagree	00	00
Strongly disagree	00	00
Total	100	100

Chart showing employees' opinion about “good employer-employee relationship improves employee performance”

Sl. No.	Observed value	Expected value	Chi-square	df	p-value
1	67	20	20	4	0.0001
2	28	20	20	4	0.0001
3	5	20	20	4	0.0001
4	0	20	20	4	0.0001
5	0	20	20	4	0.0001
<b>Total</b>	<b>100</b>	<b>100</b>			<b>164.9</b>

#### Table showing Chi-square test

#### Analysis:

The estimated value is comparatively larger than the table value, therefore the null hypothesis is rejected. For degree of freedom 4 with level of significance 0.05 the table value will be 9.49 whereas the estimated value is 164.9 thus, through this Chi Square test we can understand that employer-employee relationship has an impact on employee performance and the impact is positive in nature.

## 8. Conclusion

A study on the Impact of employer-employee relationship on employee performance with reference to select manufacturing companies in Dakshina Kannada reveals that being employees, as one of the key components of an organizations it is important to understand their behaviour at the workplace and their expectations from the employer which in turn helps the employer and management in establishing a healthy relationship with its workers in the organizations which ultimately leads to better efficiency and productivity of employees.

Study results also stated that it is salary, incentives and benefits have a huge impact on employee performance and employer need to pay enough attention in providing fair incentives to his workers which motivate employees to work better and also reduce the attrition rate of the organization. And it is proven that most of the employees in the organizations believe that good employer-employee relationship will positively impact their performance.

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# A Study on the Impact of Motivation and Empowerment on Employee Performance concerning Select Manufacturing Companies in Mangalore

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## ***Abstract***

*This paper is about a study on the Impact of Motivation and Empowerment on Employee Performance. The study has been undertaken in select manufacturing companies in and around Mangalore with the objectives to identify the factors affecting employee motivation and empowerment and finding out the impact of motivation and empowerment on employee performance. The data for the study has been collected through primary sources such as observation and questionnaire methods and secondary sources such as the website of the firm. The sample size for the study was 100 respondents from select manufacturing units. The data collected was analyzed by the methods such as graphical representation and tabular format. The Chi-square test has been used as a statistical tool. The study revealed that there is impact of motivation and empowerment on employee performance.*

## **Keywords**

***Employee, Motivation, Empowerment, Employee Performance***

## **1. Introduction**

Employee Motivation and Empowerment are an essential part of Human Resource Management. Employee motivation is the most crucial aspect of a company's long-term success. Empowerment has a good impact on motivation, which leads to improved performance. If employee motivation is done correctly, it will boost them to work hard, it will drive teamwork which will lead to maximum job satisfaction. Employee commitment, creativity, productivity, and motivation all improve when employees are empowered.

Employee motivation and performance improve with a higher level of confidence. Motivation is increasing the likelihood of success by removing obstacles and empowering people.

## **2. Objectives of the Study**

- To study the factors affecting employee motivation and empowerment.
- To Study the impact of motivation and empowerment on employee performance.

## **3. Scope of the Study**

The study goes into great detail about how motivation affects an organization's effectiveness. It is essential for the achievement of business objectives. Employee motivation and empowerment normally tend to have a variety of effects. The study is confined to select manufacturing companies in and around Mangalore.

## **4. Methodology**

The present study is descriptive research by means of primary data analysis. Data has been gathered from the respondents through a questionnaire, observation, and interaction with the HR Manager. The sample was drawn by convenience sampling techniques with a total of 100 respondents from select manufacturing units in and around Mangalore. The data collected was analyzed by the methods such as graphical representation and tabular format. The Chi-square test has been used as a statistical tool.

## **Hypothesis**

Null hypothesis

H<sub>0</sub> - There is no impact of motivation and empowerment on employee performance

Alternate hypothesis

H<sub>1</sub> . There is an impact of motivation and empowerment on employee performance.

## **5. Theoretical background of the study**

Employee motivation is the practice of empowering employees in the workplace. This has its own procedures for determining people's behavior and productivity at work. Motivation is defined as an individual desire to work in the context of organizational activities. An employee who is highly driven is more productive than those who are not. motivation and empowerment, on the other hand, are totally linked.

Employee motivation refers to an employee's level of enthusiasm, and commitment in the workplace. Employees are the company's most valuable asset. Employees should be motivated by monetary and non-monetary incentives, prizes and recognition, and positive appraisal and incentives. incentives might be financial or non-financial.

Empowerment gives workers internal rewards by allowing them to make self-decisions. Employees link their success to their own abilities, which encourages them to achieve their objectives. Empowerment has a major impact on employee happiness and as a result on organizational performance. Empowerment permits people to think, act, make decisions and direct their own job, it delegates responsibilities and tasks.

## **6. Literature review**

### **1. VU Minch Hieu (2020)**

Empowerment is a management style it boosts employees' creativity, quality of the work-life, the spirit of teamwork, and organizational effectiveness, so here motivation is like inspiration. Empowering leadership is sharing the power and motivating the employees for superior performance.

### **2. Sireesha Nethi**

Organization Runs because of the people working for it, and each person contributes toward achieving the ultimate goal of an organization. Motivation works as a catalyst for individual employees working for an organization to enhance their working performance or to complete the task in a much better way than they usually do.

### **3. Rajeshwari Devadass (2011)**

Worker motivation is a dynamic process. To motivate the employees effective training programs and workshops to be conducted in the workplace.

### **4. Pooja Dangol (2020)**

The research study aims to investigate motivational factors such as rewards and recognition, training, appreciation, etc. The organization should provide a workspace that is engaging and motivating, where employees want to stay, contribute and grow their skills, knowledge, and expertise. The Organization should include a personnel development program to improve performance.

### **5. Supriya Mahajan (2015)**

Every company and organization wants to be successful. Employee retention is a difficulty in today's highly competitive environment. Motivation is the driving force by which humans achieve their goals. Employees and businesses should establish and maintain a strong and good relationship. The organization adopts several tactics to compete with competitors and improve overall performance in order to achieve wealth.

### **6. Vinay Chaitanya Ganta (2014)**

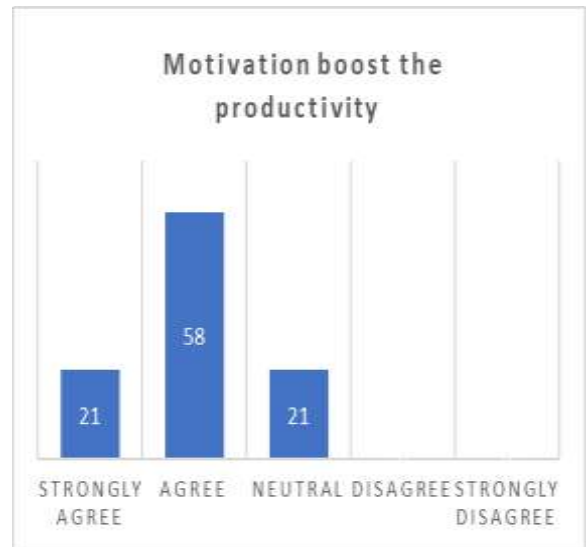
Employees need the motivation to feel good about their professions and perform at their best. Motivation has a direct impact on employee productivity. Employee motivation is always a central problem for managers and leaders. employee Motivating employee productivity is directly influenced by motivation level in the workplace so workers that are motivated and enthusiastic about their employees do their jobs to the best of their abilities.

## 7. Data Analysis and Interpretation

### 7.1 Motivation boosts the productivity

#### Interpretation

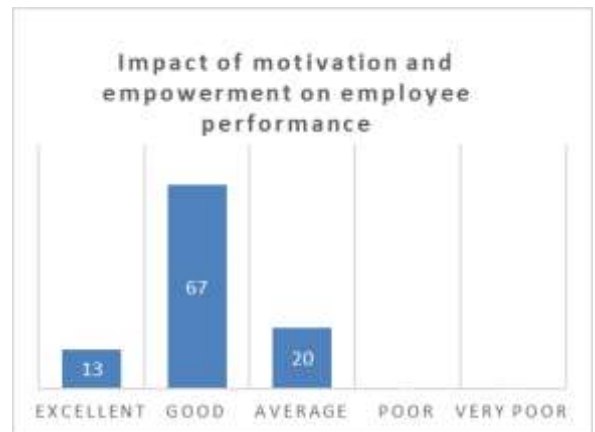
From the chart, we can see that 58% of the employees agreed that motivation always encourages employee productivity, and motivation always minimizes absenteeism and maximizes the productivity and quantity of work they expect more and more opportunities for career development aspect so that they can have a comfortable work environment. So, motivation will boost the performance of the employees. An organization always appreciates new ideas, and unique solutions encourage smart work & creating a collaborative work environment.



### 7.2 Impact of motivation and empowerment on employee performance

#### Interpretation

Here 67% of the employees gave positive opinions about the motivation and empowerment aspect of the company.



#### Statistical Tool-Chi-square Test

#### Interpretation

The estimated value is 152.9 and the table value is 9.49, so we can say that the estimated value is greater than the table value, and therefore null hypothesis is rejected. So we can say that there is an impact of motivation and empowerment on employee performance.

SI. No.	Observed value	Expected value	(O-E)	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
Excellent	13	20	7	49	2.45
Good	67	20	47	2209	110.45
Average	20	20	0	0	0
Poor	00	20	20	400	20
Very poor	00	20	20	400	20
Total	100	100			152.9

## **8. Findings**

1. Employees were happy about the job security at the workplace so it will create confidence in employees' mind that he will not lose the job he is holding on.
2. The organizations motivate the employees to reach the target so because of these rewards and recognition, an organization can achieve its goals and objectives.
3. Employees were happy about a working environment where employees had career growth and a comfortable work-life balance.
4. Employees agreed that the organization always appreciates new ideas, and unique solutions encourage smart work & creating a collaborative work environment.
5. Motivation always increases productivity and improves performance while meeting the target.
6. Employees agreed that the organization has taken welfare measures, it's something that employees get additional wages than regular and other economic benefits which will beneficiary for the company to retain the employees.
7. Employees agreed that organizations provide the training facilities to the employees so that employees can improve their extra skills and additional knowledge.
8. Employees have given their consent that from both levels, they are getting support in the way of providing feedback on the basis of performance and recognition for success.
9. Employees agreed that empowerment improves employee commitment, creativity, and productivity. Empowerment always boosts employee satisfaction, increasing employee loyalty it encourages collaboration and teamwork.
10. Organizations provide a responsibility to take decisions in case of collecting the information, and to determine what the alternative could be, so there is the freedom to take decisions.

## **9. Conclusion**

From this study, it revealed that in this competitive world it is necessary to reach the target within the time for which motivation is essential. Employee productivity, teamwork, commitment, creativity, and motivation all improve when employees are empowered. Motivation may be monetary and non-monetary incentives, traditional incentives such as monetary remuneration, aren't always the most effective motivators.

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# Patent Reduction to Practice and ESG Compliance: Developing A Framework for Responsible Investments and Sustainable Innovations

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## **ABSTRACT**

*Patents help in protecting research and development (R&D) efforts in an organization. They are known to increase valuation during merger and acquisition and act as signal for investors to make investment decisions in a firm. Patent reduction to practice can be actual or constructive. In actual reduction to practice, the invention is carried out and working of patent is established. In constructive reduction to practice, the working of patent is not established, and the patent application is granted based on sufficiency of disclosure and meeting patentability criteria. It is known that an actual reduction to practice is not a requirement for getting a patent granted. Despite the value that patents add to a firm, vast majority of patents remain unutilized across the world.*

*Environmental, Social, and Governance (ESG) investing is gaining popularity and investors are increasingly using ESG analysis to make investments. For patents, where there has been an actual reduction to practice, we propose a conceptual framework to check ESG compliance of process involved. We believe this will foster responsible investing, sustainable innovation, business model innovation, paving way for better patent utilization.*

**Keywords:** Patent utilization, Responsible investment, patent reduction to practice, ESG compliance, sustainable innovation, SASB Standards, Sustainable business models

## **1. Introduction**

R&D is core to innovation. Assigning a value to the results of R&D, also known as valorisation, is often considered a measure of the return on investment for universities, public research organizations, and public-private partnerships conducting research. One of the outcomes of R&D is patent filing. Often, patent applications and granted patents are used as a measure of efficiency of the R&D work. A frequent problem that firms cite is their inability to commercialize or utilize the patents they own. Studies reveal that most patents remain unexploited or unutilized within firms. In a recent report by European Patent Office (EPO), wherein a survey conducted to measure valorisation of scientific results showed that out of the respondents interviewed, 63% of respondents said the reason for failure to commercialise patents is because they are at the R&D stage, 55% said it is because commercial opportunities have not yet been identified, and 38% said they failed to find interested partners (EPO, 2020).

For getting a patent granted, it is not a requirement to show an actual reduction to practice. Patent reduction to practice can be actual or constructive. In actual reduction to practice, the invention is carried out and working of patent is established. In constructive reduction

to practice, the working of patent is not established, and the patent application is granted based on sufficiency of disclosure and meeting patentability criteria. For patents, where there has been an actual reduction to practice, we propose a conceptual framework to check ESG compliance of process involved. Our hypothesis is that developing a framework for ESG materiality issues for patent actual reduction to practice will foster responsible investing, sustainable innovation, paving way for better patent utilization.

## **2. Patent as signal for investments**

Patents act as a signal for investors to make investment decisions in a firm. Startups and larger firms file patents for several reasons, for example, to protect R&D efforts, to act as an effective marketing tool, or to bring revenue through licensing or sale. Several research findings discuss how patent filings act as a signal for investors to fund startups. Availability of funding spurs further innovation and it is observed that venture capital and innovation is correlated with entrepreneurship opportunities (Kortum & Lerner, 2015). Patent filings act as a credible signal to venture capitalists about the startup firm quality. This becomes a key decision making factor to make investments into the startup (Cao & Hsu, 2011). Several studies suggest that the reason companies patent at an early stage is because they would like to attract venture capital. Patents need to be looked beyond as instruments to exclude competition, and outside traditional litigation and licensing. Further, it has been found that factors that drive innovation vary between the type of industries and the size of the firms (Lemley, 2000). Farre et.al in their research findings discuss how venture capital firms view patents as a signal of quality and observe patents have the largest effect in a startup fundraising (Farre-Mensa, Hegde, & Ljungqvist, 2020).

Patents are deemed to be signals of quality since they go through stringent process of meeting criteria of patenting, i.e., industrial applicability, novelty, non-obviousness, and patentable subject matter. Not only do patents act as a signal for investors during the funding stage, but they are equally useful during mergers and acquisitions. Sharon Belenzon and Andrea Pataconi analysed 33,000 mergers and acquisition deals for patent filing trends at US Patent and trademark office (USPTO) and EPO. They observe that the value of a firm increases with innovation. Further, the authors observe that increasing total patent portfolio by one patent translates to a \$1.2 million increase in acquisition value (Belenzon & Pataconi, 2013). Investors look for the scale up potential of a startup having a patented product or solution. Further, it is important that patents should have an impact on the top line and/or bottom line in the P/L statement, to attract investments. Fig. 1 illustrates patent filing as a signal on the quality of startups for startup funding.

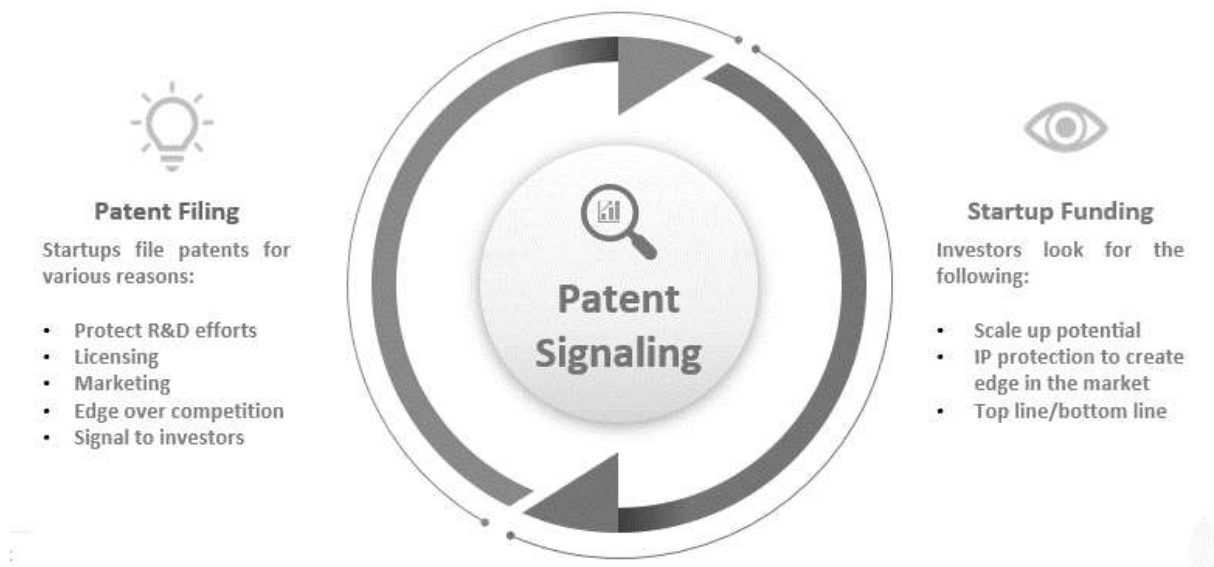
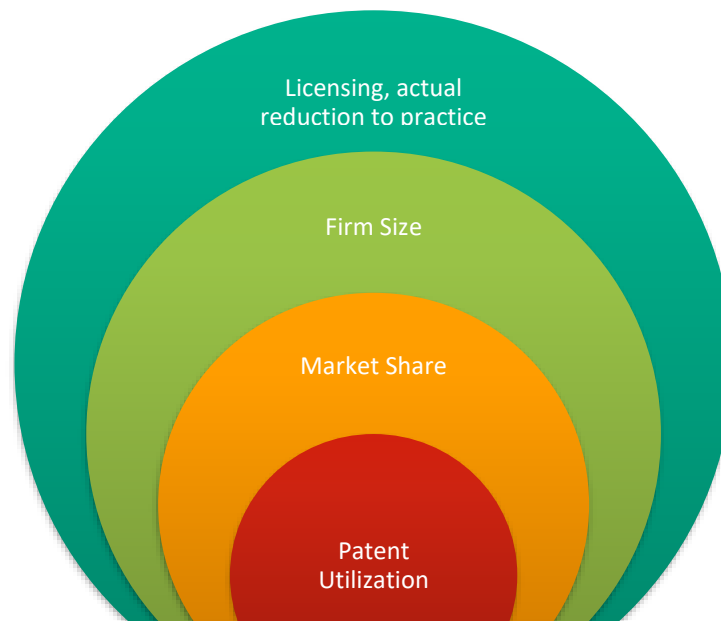


Fig. 1: Patent as signal for investments

### 3. Patent Utilization in Firms

Patent utilization rate can be defined as the percentage of all the patents that have been licensed, sold, litigated, or reduced to practice. Patent utilization or patent exploitation considers the appropriation for R&D efforts and innovation efforts of a firm. A survey of German companies on the use of patents and informal appropriation mechanisms show that only a small percentage of firms, approximately 7.4%, stress the importance of formal appropriation for R&D efforts (Neuhäusler, 2012). (Peter van Dongen, 2014) discusses how patents resulting out of academic inventions are utilized or exploited in the Netherlands. It was found that variety of IP strategies have been used to utilize patents and more than 50% of patents are un-utilized and remain for further development and innovations. Alfonso et. al discusses the market for patents in Europe. Among the determinants of patent licensing such as patent breadth, value, protection, firm size, the most important determinant is firm size. The study reveals that the probability that a large firm offers a patent for licensing is about 19% lower than a small firm (Alfonso Gambardella, 2007). It is also found that patent utilization is dependent on the firm's market share. It is found that market share influences three modes of patent exploitation, own use or reducing to actual practice, licensing, and blocking (Donghyuk Choi, 2018). Fig. 2 illustrates factors influencing patent utilization.



*Fig. 2: Patent utilization in firms*

#### **4. Responsible investments**

Environmental, Social, and Governance (ESG) investing or responsible investing is gaining popularity and investors are increasingly using ESG analysis to make investments. Organizations around the world are taking steps to be compliant to sustainability disclosures in their annual reporting. In November 2021, the International Financial Reporting Standards Foundation or IFRS Foundation, the organization that oversees financial reporting standard-settings around the world, announced the formation of the International Sustainability Standards Board (ISSB) to develop sustainability disclosure standards to meet investors' information needs. The ISSB will build upon existing Sustainability Accounting Standards Board (SASB) Standards with inputs from companies, investors, and regulators to simplify sustainability disclosures.

(Henriksson, Livnat, Pfeifer, Stumpp, & Zeng, 2018) has done an extensive literature review on the benefits of ESG compliance by companies. According to Henriksson et al., companies with better ESG scores tend to be able to borrow more cheaply, have higher credit rankings and lower cost of equity capital. According to (Goss & Roberts, 2011), low-quality borrowers that engage in discretionary corporate social responsibility (CSR) spending, face higher loan spreads and shorter maturities. (Schneider, 2011) discusses that a firm's operating sites and facilities that might be acting as collateral can become a liability, rather than an asset, when they are associated with polluting operations. (Derwall & Verwijmeren, 2007) has done study on Governance metrics international (GMI) to evaluate corporate governance practices of U.S. firms. The authors found evidence that better governance is associated with lower firm-specific risk, lower systematic risk, and a lower implied cost of equity capital.

#### **5. Sustainable Innovations**

Sustainable innovation can be defined as an advancement or improvement of a company's products, services, or processes which will have a positive social and environmental impact and at the same time create profit or economic benefit for the company. Inventions can be defined as technical improvement of a product or a process and are deemed to be patentable if they have an industrial application, is novel, non-obvious, and falls under patentable subject matter. Sustainable innovation of a company's process often translates to sustainable business model innovation. According to Bocken et. al sustainable business model involves value creation, value capture and value delivery (Bocken, Schuit, & Kraaijenhagen, 2018). Sustainable business model innovation involves complex and systemic tasks and at times is equated to circular business models where the value creation, value capture and value delivery incorporates reusability and recycling. Hernandez et.al introduces a conceptual framework of an integrated sustainable business model and intellectual property (IP) canvas (Hernández-Chea R, 2020). The conceptual framework is aimed at bridging gap of how to integrate intellectual property, including patents, into sustainable business models.

Ever since India opened for economic liberalisation and became part of the World trade organization (WTO) and signed the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement in 1995, India has witnessed technological advancement. The tenth

annual U.S. Chamber International IP Index 2022 ranks India at 44th rank among the top 55 countries who have fared well in intellectual property rights. In 2016, Indian government introduced the startup India program where more than 60000 startups have benefited. Joshi et. al, discusses the startup emergence within applied universities in India. Of particular importance is the Indian Institute of Technology, Madras and National Chemical Laboratory, Pune. The paper analyses the pre-incubation level processes that have resulted in enhanced opportunity recognition potential. The authors explore the process from pre-incubation level and refer to the startup incubators that are situated in these universities (Kshitija Joshi, 2021). Panda and Joy emphasise the importance of IP based debt lending for startups and the need for change in the role by Indian banks (Bibekananda Panda, 2021).

To study the patent landscape having sustainable innovations, we analysed 391 startups funded by Alternative investment funds (AIF)- Fund of Funds for startups (FFS), under startup India from the period 2016 to 2020. We analysed funded startups who have filed at least one patent at the Indian Patent Office. Specifically, we did search in the Indian patent Office database to see if patents disclose environmental sustainability or social sustainability in the description or claims section.

**Innovations having environmental impact:** We define patents with environmental sustainability impact to be in any one of the following applications:

- a. Renewable energy inventions
- b. Recycling – down cycling based inventions
- c. Water consumption or saving inventions
- d. Inventions around greenhouse gas (GHG) emissions or reduction of harmful gases.

**Innovations having social impact:** Secondly, we selected patents that disclose social sustainability in any one of the following applications:

- a. Reusability – up cycling or circular economy model based inventions
- b. Energy saving by sharing or sharing economy model based inventions
- c. Subscription based models or access economy based inventions.

Out of the 391 startups analysed who received funding, 16 filed for patents, out of which 5 startups filed patents having either environmental and/or social impact. Table 1 lists the patent domains of the startups, the funding received, and the ESG impact of patents.

Patent Domain	Environmental impact	Social impact	Funding (USD)
Chemical	Yes	Yes	1356114
Mechanical	Yes	Yes	527647
Electrical	Yes	No	424544
Bio-medical	Yes	No	376024
Communication	No	Yes	181947
Computer Science	No	Yes	52158

Table 1: Startups with patents having ESG

One can observe from Table 1, that an ESG compliant startup from the chemical industry, which is traditionally associated with lower ESG scores, has received the highest funding when compared to firms from other domains who are also ESG compliant. Another observation is firms that were compliant to both environmental and social sustainability received higher funding than the firms that scored on any one of environmental and social sustainability.

## **6. Conceptual Framework**

Firms typically base their reporting on sustainability on the widely recognised Sustainability Accounting Standards Board (SASB) Standards. In order to identify environmental, social, and governance (ESG) issues associated with diverse industries, SASB guidelines offer guidance on materiality evaluations. Our goal is to create a conceptual framework that businesses and investors may use for ESG compliance during the process of converting patents into actual practise. We based the framework's development on the SASB's materiality evaluation. We think enterprises can obtain finance and contribute to better IP usage by following the materiality assessments.

To test our hypotheses and develop the framework, we took insights from a process audit conducted for an automobile manufacturing firm in Bangalore. Since the firm is in the process of raising Series C round of funding, an alias name ABC firm is being used in this case study. ABC firm has filed more than 50 patents and about 25% of the patents are granted at the Indian Patent Office, and out of those, more than 50% patents are reduced to actual practice and is used in their vehicles. Our task was to check whether the processes followed in the firm while reducing the patent to actual practice addressed materiality assessment issues under SASB. Materiality assessment for automobiles falls under transportation industry in SASB materiality finder (SASB, 2022). The various relevant materiality issues for ABC firm are:

**Social Capital: Product quality and safety,**

**Human Capital: Labour practices, and**

**Business model & innovation: 1. Product design and 2. Material sourcing and efficiency**

We then categorized ABC firm's various processes under each of the above materiality issues.

**Social Capital: Product quality and safety**

We observed that the ABC firm adhered to the following during product development:

1. Product quality and safety guidelines outlined and documented during the product design phase.
2. Objective key results (OKR) are broken down to process tasks to be achieved at various milestones.
3. Checks at various phases during the process.

**Human Capital: Labour practices**

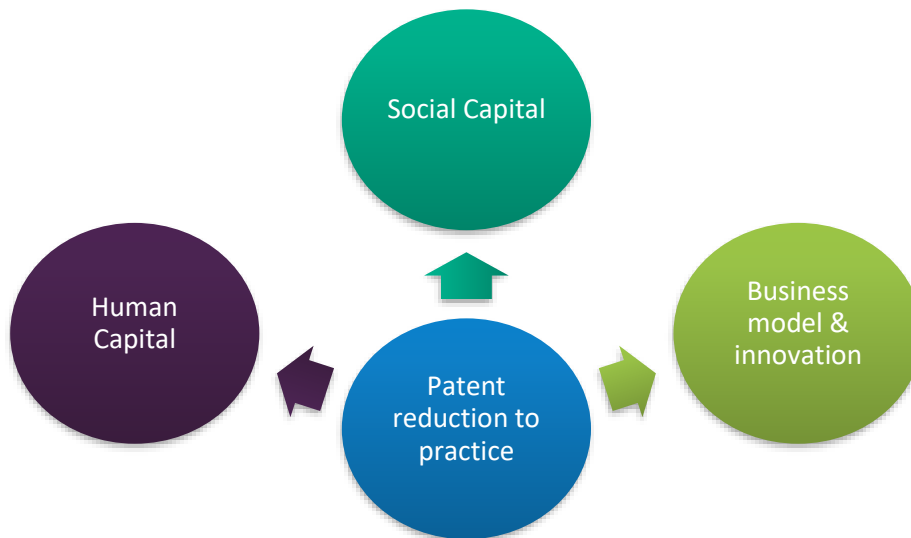
We observed that the ABC firm adhered to the following work culture to drive innovation:

1. Training on intellectual property, invention mining, were provided during onboarding of new employees and at regular intervals after appointment of employees.
2. The work culture was such that the employees are encouraged to communicate directly to the IP team, and it was not mandatory to seek permission from product manager to file patents.
3. For every innovation, teams are rewarded rather than individuals.

**Business model & innovation:**

1. Product design and development: We observed that teams engage in product design and development in a non-hierarchical fashion. Each team is multi-disciplinary, and resources are pooled from various departments including finance and legal. This led to greater innovation and patents were generated that were directly relevant to the product. This facilitated better patent utilization.
2. Material sourcing and efficiency: Vendor audits are done in length and breadth including audit of working conditions of the staff at vendor premises.

We found that the ABC firm addressed the materiality issues as outlined in SASB, and our inference is that this led the firm to have better patent utilization. The firm has received substantial funding around 250 million plus USD so far. The conceptual framework for ESG compliant patent reduction to practice process for automobile industry is shown in FIG. 3.



*Fig. 3: Conceptual Framework for Automobile Industry*

**7. Conclusion**



Our findings demonstrate that ESG-compliant businesses have increased funding prospects. Additionally, a case study of an automobile manufacturing company with significant funding demonstrates that processes when ESG compliant facilitates patent utilization. Future work will include creating a conceptual framework and evaluating the ESG compliance and materiality issues of inventive companies across multiple industries.

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## IPR: A Tool for Protecting Entrepreneurial Growth

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### ***Abstract***

*India is witnessing a sharp increase of start-ups because technological advancement. The innovative ideas and the creative mind set increases the entrepreneurial development. It is important for entrepreneurs to protect their originations and new business philosophies. Globalization and opening up of the new markets make "Intellectual Capital" as one of the key wealth drivers in the present era. Current paper examines the importance of IPR status in India and explore the challenges of IRP in India with a special focus towards entrepreneurial development. The paper employed review of related literature from reputed journal papers. Paper concludes that the entrepreneurs should protecting their new creativity by IPRs which helps the start-ups in generating huge revenue which in turn increases India's GDP. It also recommends that still India needs lot of effort for the effective implementation of IPRs for its entrepreneurial growth and development.*

**Key words:** Patents, technology development, revenue generation,

# Organizational Goal setting with Agile

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**ABSTRACT** Agile is the way we look at things happening around us. Agile is a behavior pattern, how you look at the world's complex situations, how you react to situations, how you visualize a solution, how you reach the solution. You can either think of a complex problem or a situation and worry about it or you break that into meaningful small chunks & try to solve it. Agile adds that fun element of tackling smaller challenges systematically.

As we move from the traditional hierarchical working to self-managing and agility, it is evident for teams to see the radical shift in people's day-to-day behaviors. These new ways of working bring in an increased sense of ownership, proactive, open communication, accepting failures, and more importantly trust and transparency among team members.

Organizational goals are strategic objectives that a company's senior leadership establishes to outline expected business outcomes and encourage employees' efforts to accomplish the same. Management by objectives by Peter Drucker was the first known organizational goal setting frameworks followed by SMART goals (Specific, Measurable, Achievable, Relevant & Time-bound), KPIs (Key Performance Indicators) and now OKRs (Objectives & Key Results).

**Keywords:** Agile, Agility, Goal Setting, Leadership, Management by Objectives (MBOs), SMART goals (Specific, Measurable, Achievable, Relevant & Time-bound), KPIs (Key Performance Indicators) and now OKRs (Objectives & Key Results).

## 1. INTRODUCTION

If you want to live a happy life, tie it to a goal, not to people or things. Albert Einstein

The goal-setting framework is a process that gives step-by-step instructions and information on how to organizations get started with companywide goals and what actions to be taken to achieve them in a given time frame.

Goal-setting framework consist of three steps:

1. Setting clear goals for the organization
2. Design a roadmap on how to convert organization plan into action
3. Track and monitor progress

Organization Goal Setting Framework is a process that standardizes the goals and vision of the entire organization to ensure two important points:

1. Each Employees clearly understand what is the exact leadership expectation that has been set for them.
2. Each individual and team goal should be aligned back with the team and company objectives.

Goal-setting frameworks come in varied forms & formats. With this current VUCA (volatility, uncertainty, complexity, and ambiguity), the world is depending largely on how organizations are embracing the change. Organizations with Agile behavior attributes help teams and organizations thrive by showcasing values such as Respect, Openness, Commitment, Courage, Transparency & Self-Organizing.

Current and future trends indicate that organizations are currently operating in disruptive environments and Agile goal setting framework like OKR are the cornerstone to building a culture of agility and effective change management.

“OKRs are a Silicon Valley Goal management framework. It’s a simple system for creating alignment with dynamic, measurable goals with short cadences”.

OKR (Objectives and Key Results) is a goal setting framework. It is a simple approach to create alignment and engagement around measurable and ambitious goals. OKRs are frequently set, tracked, and re-evaluated. OKR is a simple, fast-cadence process that engages each team’s perspective and creativity.

OKR’s original concept came from Intel and spread to other Silicon Valley companies. Google adopted OKR in 1999, during its first year.

## **2. REVIEW OF LITERATURE / THEORETICAL FRAMEWORK**

Organizational goals are strategic objectives that an organization leadership establishes to outline expected outcomes or targets and guide employees' efforts to achieve them.

Goals help define an organization purpose, assist its business growth and achieve its financial objectives. Setting specific organizational goals can also help an organization measure their organization's progress and determine the tasks that must be improved to meet the same.

Organizations should clearly communicate organizational goals to engage employees in their work and achieve the organization's desired objectives. Having a clear idea of organizational goals helps employees determine their course of action to help the business achieve those goals. Employees should also be prepared with the proper knowledge and resources needed as they do their work to help meet the overall organizational goals.

Teams are no longer feature factories; they deliver things that solve business problems. OKRs are the missing link between Agile and Lean and bridge the gap between product and engineering. For this the OKRs cannot be based on activities, but on value / results.

OKRs were initially developed at INTEL by Andrew Grove and were loosely based on Management by objectives by Peter Drucker, later, John Doerr took the concepts to Google.

OKRs played very key role for Google’s growth and are in the organization’s DNA.



Figure # 1: Chronology of Goal Setting

- Management by Objectives is focused on competition, and encompasses improving existing products and processes. Human knowledge is the fuel in which it works, and this is where top management will realize the need for a new human resources policy for the third millennium.
- SMART Goals promote goal setting more accurately. S is for specific, M for measurable, A for attainable, R for relevant, and T for temporal.
- KPI stands for Key Performance Indicator, which means Key Performance Indicator. This indicator is used to measure the performance of a company's processes and, with this information, collaborate to achieve its goals.
- OKR (Objectives and Key Results) is a complete goal management system with artifacts, events and roles. It is a simple approach to creating alignment and engagement around measurable goals.

**Organizational Goal setting with Agile**

“At any level you will have only four or five goals followed by three key outcomes. If everything is a priority, nothing is.” – John Doerr

Instead of setting annual targets, implementing short-term goals, usually quarterly. Unlike traditional targets, which are usually set at the beginning and end of the year, OKRs have a standard three-month cycle. This allows the goals to be adjusted according to the constant changes in the market.

In previous goal setting frameworks, goals were static throughout the year. The period of three months can be customized according to the needs of the company, the ideal would be to find the optimal periodicity, however, this periodicity should be of short validation cycles.

60 % of the goals come from bottom-up teams rather than top-down teams. The top management defines the strategic guidelines and the teams interpret these guidelines by suggesting emerging OKRs. 40 % of the OKRs come from top and middle management. This information reaches the teams and they are responsible for producing 60 % of the complementary OKRs. The OKRs are not cascaded but aligned across all layers of the organization.

What are OKRs?

- OKR (Objectives and Key Results) is a goal setting framework. It is a simple approach to create alignment and engagement around measurable and ambitious goals. Objectives tells us where to go & Key Results how you will get there.
- Agility flavor - OKRs are frequently set, tracked, and re-evaluated – usually quarterly. OKR is a simple, fast-cadence process that engages each team’s perspective and creativity.

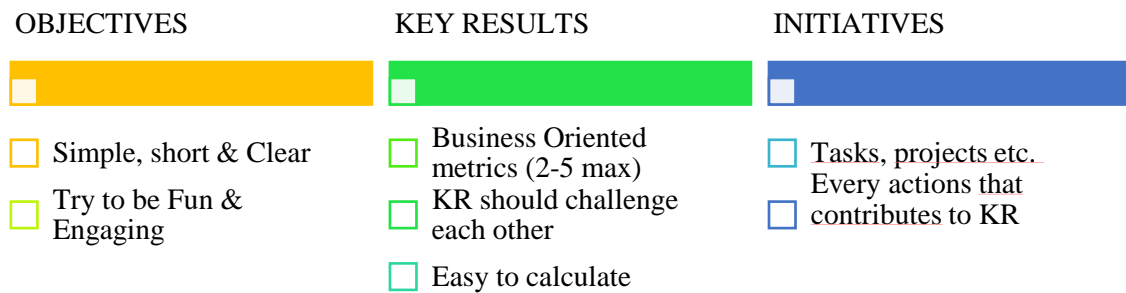


Figure # 2: OKR

Objectives have to be inspiring, ambitious and emotionally engaging, with a team language. It’s the motivators that will make people get up from bed with motivation every morning and go to work. One should consider the culture of the organization when writing them. They must not contain numbers; they are general ideas. Key Results will in turn make these ideas land in the world of results.

- Inspirational (aspirational) - Engages Emotionally.
- Not numeric.
- Organization language and humor.
- Ambitious and common.

Key Results must be results; they cannot be routine activities. One of the major difficulties of organizations is in defining key results as activities rather than outcomes. Key Results must contain numbers and can be key KPIs as redundant as this may seem, they can also be levels. Levels are great achievements and steps forward in the ultimate goal. The evidence presented for Key Results may be improvements in indicators or even large deliverables.

The best OKR adoptions assume that different goals have different rhythms, as tactical goals tend to change much faster than strategic goals. Then OKR decouples strategy and tactics by adopting a cyclic pattern (nested cadences).

- A strategic cadence with long-term, high-level OKRs for the business that are not definitive. The organization should maintain an ongoing strategic conversation and revise the company’s OKRs if necessary.
- A tactical cadence with short-term OKRs for teams.
- A follow-up cadence with regular check-ins to track results along the way.

OKRs have nested cadences, as they understand that different goals have different cycles.

1. An annual strategic cadence to define the organization's strategic objectives for the coming year (annual objectives). These objectives are not fixed, but serve as a basis for quarterly objectives and should be discussed frequently.

1. A quarterly tactical cadence, where the middle management OKRs and quarterly operational teams are prepared, always following the guidelines of the annual strategic OKRs. These OKRs are defined at the beginning of the quarter and terminated at the end of the quarter.

2. A weekly operational rate for monitoring tactical and operational OKRs. This cadence is the heart of the OKRs system, at this meeting the progress of the OKRs is monitored. If this progress is not adequate, an action plan needs to be defined.

### Characteristics of OKRs

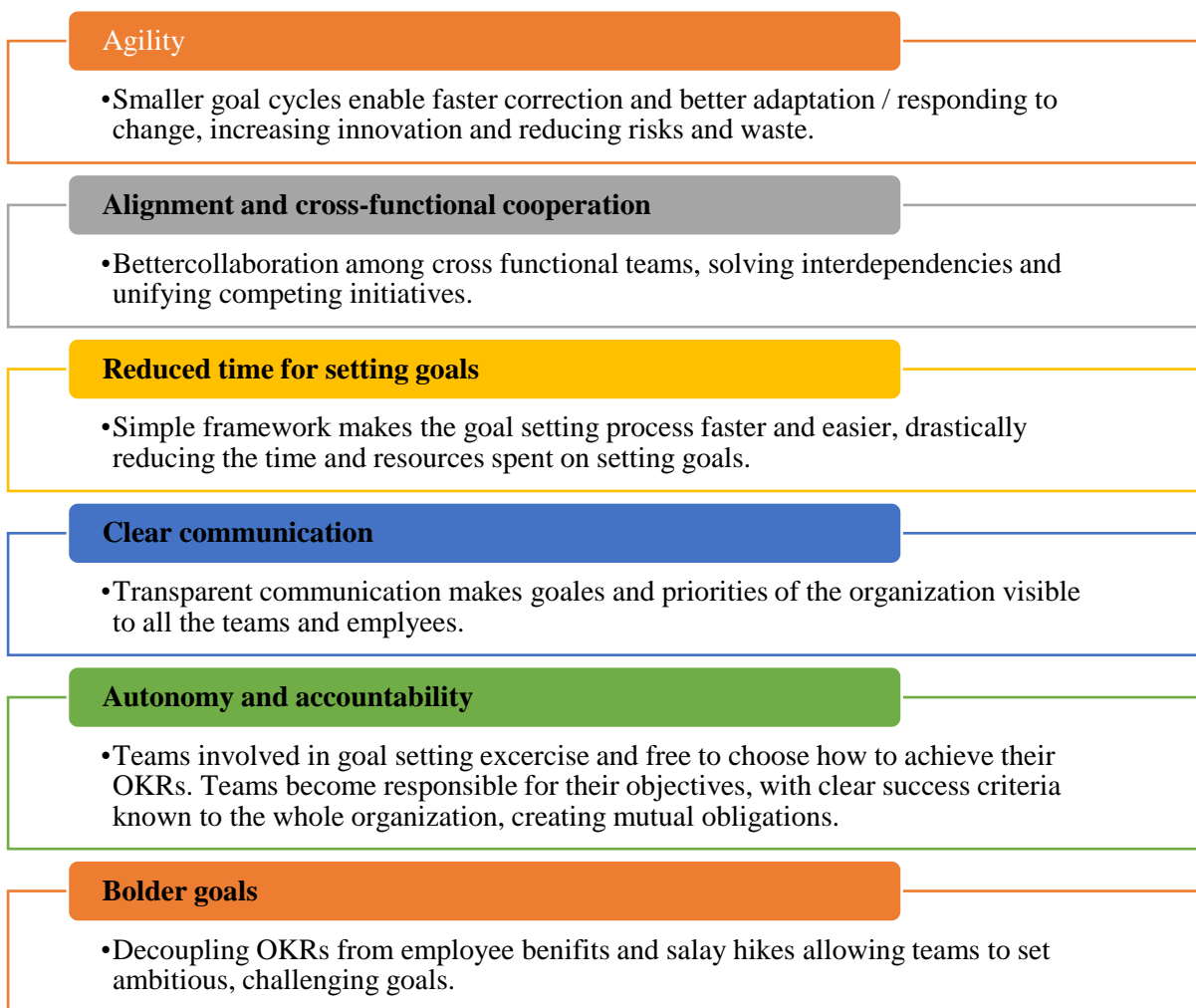


Figure # 3: OKR Characters

### 3 RESEARCH DESIGN / METHODOLOGY

This study involves quantitative approach for research. The data will be collected using structured questionnaires from agile teams. The quantitative approach would be used to get a good understanding of how teams are successful implementing agile at scale framework with leadership influence. Quantitative approach and questions including



qualitative in some context of this study to enable generalization of the results over a larger agile team to obtain a better knowledge of how the impact of leadership & teams drive towards achieving desired outcomes & results. The study revolves around people & agile at scale framework implementation.

The sample size for collecting the data was 475 across different IT industry sectors. Primary data was collected using a structured questionnaire containing both open-ended and closed-ended questions with Respondents including profiles - Developers, Testers, Scrum Masters, Product Owners, Business Representatives, Agile Coaches, Release Train Engineers, Solution Train Engineers, Tech Managers & other Service team members. Due to the pandemic, Questionnaires will be hosted online & video interviews were conducted where ever necessary for Data collection.

For this research study, convenience sampling will be more useful. Convenience sampling enables easy selection of the population under study and also helps in fulfilling the objectives of the research. The organizations (IT majors) who are currently in Agile at scale mode, sample will be decided on the basis of their Delivery predictability, faster time to market, employee motivation, productivity increase & defect reduction.

**Plan of the Study conducted as stated below:**

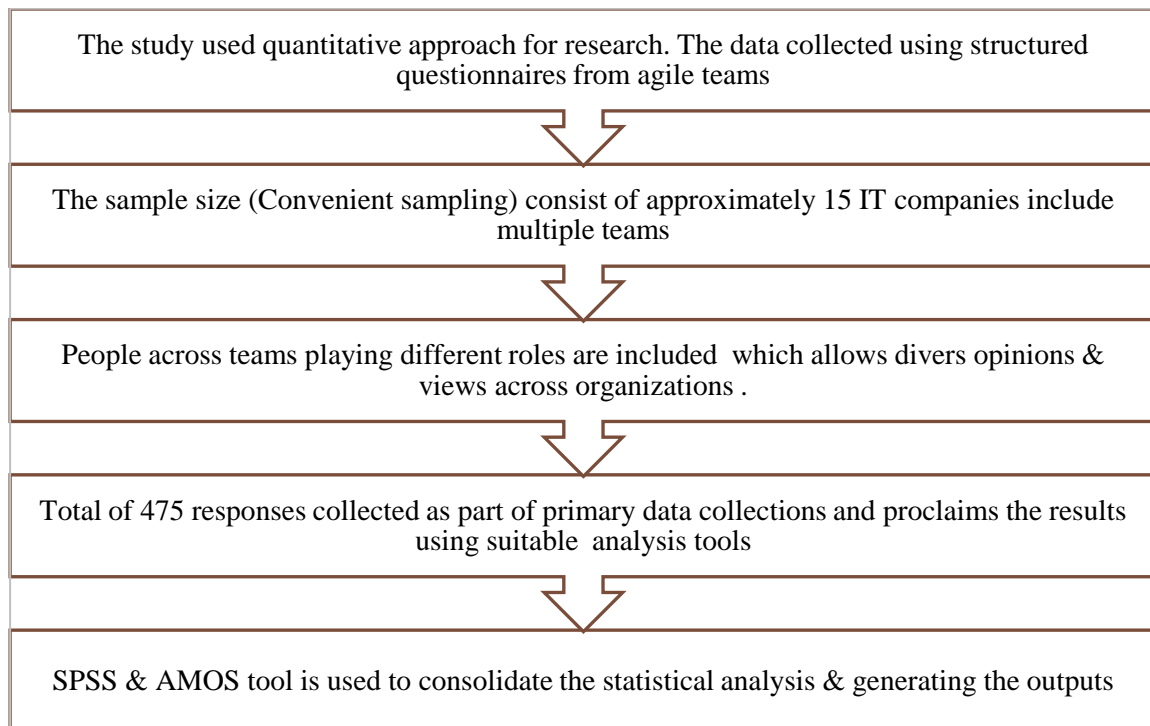


Figure # 4: Methodology

## 4 ANALYSIS AND INTERPRETATION /RESULTS & DISCUSSION

### Demography and varied roles of respondents:

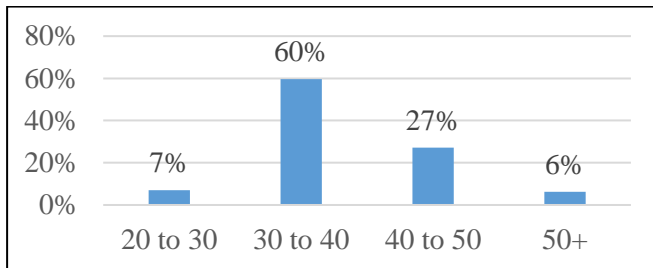


Figure 5. Respondent Age Group

### The Role You Play in Agile & Scale Environment

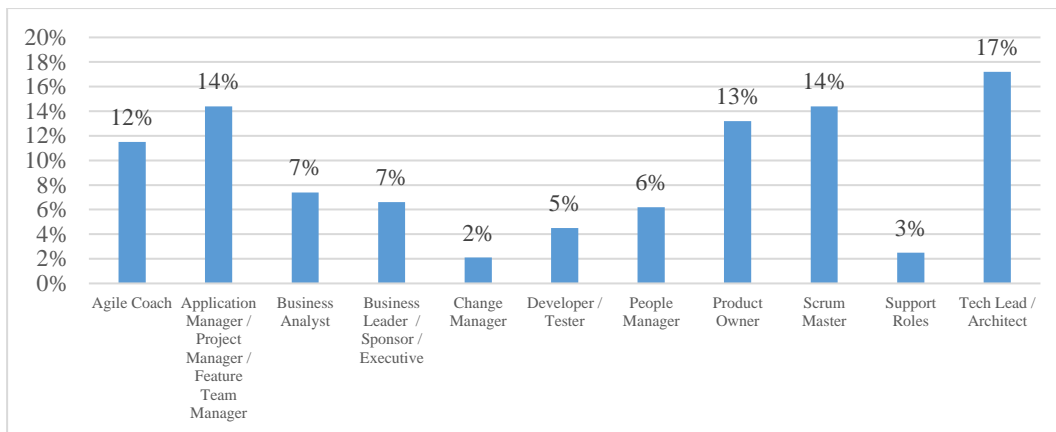


Figure 6. Respondent's The Role You Play in Agile & Scale Environment

From the following table we can observe that, about 52.0% of the respondents were working in a company with size of 10000 + employees. Following bar chart also shows taller bar corresponding to the same.

Company size		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1000 - 5000 Employees	82	17.3	17.3	17.3
	10000 + Employees	247	52.0	52.0	69.3
	5000 - 10000 Employees	124	26.1	26.1	95.4
	less than 1000 Employees	22	4.6	4.6	100.0
	Total	475	100.0	100.0	

Table 1: Company Size

From the following table we can observe that, statement “Mutual transparency allows better collaboration” had a high mean value of 4.74 with a standard deviation of 0.5.

<b>Descriptive Statistics - Mutual transparency allows better collaboration</b>					
	N	Minimum	Maximum	Mean	Std. Deviation
As a team (including Ops and support) work together to continuously improve our collaboration	475	3.00	5.00	4.1853	.74019
Teams are co-responsible and practice sustainability by avoiding concentrated roles and knowledge held by one single person	475	1.00	5.00	3.9768	1.03396
Teams are committed to expose our objectives, constraints and priorities to our partners	475	2.00	5.00	4.0253	.88315
On all organizational levels, synchronization points are set up, known by all teammates and carried out, including: daily meetings, backlog grooming, inter-team sessions, demonstrations	475	2.00	5.00	4.2337	1.08018
Mutual transparency allows better collaboration	475	3.00	5.00	4.7411	.50556
Managers seek to facilitate communication, sharing of knowledge and cross training of teammates both internal and external	475	1.00	5.00	4.1032	.97862
Time is dedicated to sharing of knowledge, onboarding of new arrivals, mentorship pairings, strengthened influence of most knowledgeable colleagues	475	2.00	5.00	4.1389	.91267
Team contributes to continuous improvement and take part in retrospectives openly	475	3.00	5.00	4.4105	.54916
Trust takes place in the team's culture.	475	3.00	5.00	4.4274	.57780
Regular feedback is natural and constructive, without judgement	475	2.00	5.00	4.4316	.67275
Experimentation and right to failure are core principles of our team	475	1.00	5.00	3.8695	.84433
Raising an issue is considered valuable as it drives continuous improvement	475	3.00	5.00	4.4063	.70946

Team adheres to a high standard by themselves in order to provide the best quality of product possible to clients	475	2.00	5.00	4.4947	.60368
Team values and rules exist and are built and shared by the entire team (manager included). Instead of pointing fingers, we try to lead by example.	475	2.00	5.00	4.3326	.82606
Agile & Agile at scale maturity assessments are carried out at an interval of 6 - 12 months	475	1.00	5.00	3.8568	1.17666
Valid N (list wise)	475				

Table 2: Descriptive Statistics - Mutual transparency allows better collaboration

From the following table, we can observe that, statement “Openness” had a high mean value of 3.96 with a standard deviation of 0.3,3 and statement “Self-organization” had a low mean value of 3.95 with a standard deviation of 0.36.

**Descriptive Statistics – Agile Behavioral attributes**

	N	Minimum	Maximum	Mean	Std. Deviation
Self-organization	475	1.00	5.00	3.9495	.36395
Respect	475	1.00	5.00	3.9516	.34337
Commitment	475	1.00	5.00	3.9516	.35545
Coverage	475	1.00	5.00	3.9537	.35275
Openness	475	1.00	5.00	3.9558	.33144
Transparency	475	1.00	5.00	3.9516	.35545
Valid N (list wise)	475				

Table 3 : Descriptive Statistics - Behavioural attributes

From the following table, we can observe that, statement “Team Involvement” had a high mean value of 3.96 with a standard deviation of 0.33, and statement “Retrospective” had a low mean value of 3.96 with a standard deviation of 0.34.

**Descriptive Statistics – OKR Implementation Exercise**

	N	Minimum	Maximum	Mean	Std. Deviation
Frequency	475	1.00	5.00	3.9558	.34394
Team Involvement	475	1.00	5.00	3.9642	.32605
Facilitation	475	1.00	5.00	3.9558	.32502
Retrospective	475	1.00	5.00	3.9579	.34113
Workshops	475	1.00	5.00	3.9579	.33488
Valid N (list wise)	475				

Table 4: Descriptive Statistics - OKR Implementation Exercise

From the following table, we can observe that, statement “Participation” had a high mean value of 3.96 with a standard deviation of 0.3 and statement “Respect” had a low mean value of 3.95 with a standard deviation of 0.35.

Descriptive Statistics - Maturity assessment

	N	Minimum	Maximum	Mean	Std. Deviation
Participation	475	1.00	5.00	3.9642	.29905
Stakeholder engagement	475	1.00	5.00	3.9600	.34446
Knowledge sharing	475	1.00	5.00	3.9579	.32204
Openness	475	1.00	5.00	3.9621	.32904
Respect	475	1.00	5.00	3.9516	.34946
Transparency	475	1.00	5.00	3.9474	.36074
Valid N (list wise)	475				

Table 5: Descriptive Statistics - Maturity assessment (MA)

**HYPOTHESIS:**

**Hypothesis # 1**

- H0 – Agile Behavioral attributes (commitment, courage, focus, openness, and respect) play a very important role in Scaled agile implementation
- H1 - Agile Behavioral attributes (commitment, courage, focus, openness, and respect) don't have any important role in Scaled agile implementation.

One-Sample Test							
	Test Value = 3						
	T	DF	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference		
					Lower	Upper	
Agile Behavioral attributes on OKR implementation	49.833	474	.000	1.24547	1.1964	1.2946	

Table 15: Hypothesis 4

- The T value corresponding to the mean difference between Agile Behavioral attributes and a fixed mean value of 3 was 49.833 and its corresponding p-value was  $0.000 < 0.05$ .
- Since the p-value was less than 0.05, we can conclude that Agile Behavioral attributes (commitment, courage, focus, openness, and respect) play a very important role in Scaled agile implementation.

**Hypothesis # 2:**

- H0 - Agile manifesto [(1) Individuals and interactions over processes and tools. (2) Working software over comprehensive documentation. (3) Customer collaboration over contract negotiation. And, (4) Responding to Change Over Following a Plan] play a very important role in OKR implementation
- H1 - Agile Manifesto [(1) Individuals and interactions over processes and tools. (2) Working software over comprehensive documentation. (3) Customer collaboration over contract negotiation. And, (4) Responding to Change Over Following a Plan] doesn't have any important role in OKR implementation

One-Sample Test						
	Test Value = 3					
	t	DF	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Agile manifesto play a very important role in OKR implementation	23.600	474	.000	1.10316	1.0113	1.1950

Table 5: Hypothesis 6

- The T value corresponding to the mean difference between the agile manifesto and a fixed mean value of 3 was 23.6 and its corresponding p-value was  $0.000 < 0.05$ .
- Since the p value was less than 0.05, we can conclude that Agile manifesto [(1) Individuals and interactions over processes and tools. (2) Working software over comprehensive documentation. (3) Customer collaboration over contract negotiation. And, (4) Responding to Change Over Following a Plan] play a very important role in OKR implementation.

**5. CONCLUSION**

A famous quote from Mahatma Gandhi, “be the change you want to see”, exactly reflects the Agile behavioral attributes. Organizations with Agile behavioral attributes helps to build more adaptive organizations.

With this current VUCA (volatility, uncertainty, complexity, and ambiguity), the world is depending largely on how organizations are embracing the change. Organizations with Agile behavior attributes help teams and organizations thrive by showcasing values such as Respect, Openness, Commitment, Courage, Transparency & Self-Organizing.

Current and future trends indicate that organizations are currently operating in disruptive environments and Agile goal setting framework like OKR are the cornerstone to building a culture of agility and effective change management.

Many experts in the Agile community believe that the only solution is to focus on a change is the agile Mindset. It happens that change Mindset is not actionable, we need to change the structure systems and underlying processes. The alternative is to focus on practical actions that can change the way organizations operate.

The OKR is the right tool to transform the Mindset through changes in practices, you can not expect OKRs bring results already in the early adoption cycles.

The industry study recommends at least 4 cycles of OKRs to start getting these benefits. Definitely the OKRs should make organizational culture of the party to go right.

To conclude, OKRs are not only for the IT organizations. OKRs worked well across industry sectors. Below are few examples of organizations who successfully implemented & benefited from using agile goal setting, that is OKRs.



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# Crop Insurance Recommendation System using Artificial Intelligence techniques

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## **Abstract**

**Purpose** – This research article focuses on making use of various Artificial Intelligence techniques in order to achieve three objectives – predicting crop insurance premium for crop insurance policy holders, predicting whether crop insurance can be given to an agriculturist or not and deriving insights based on the patterns in data for providing appropriate suggestions to agriculturists to avoid crop failure.

**Methodology** – The three datasets required can be got from Kaggle, Mendeley Data etc. and 5% discount is planned to be given to agriculturists who don't avail crop insurance for 3 years continuously in order to incentivise right farming practices. Regression models can be used for crop insurance premium prediction, Classification models can be used for predicting whether crop insurance can be given or not to an agriculturist and Event Data Analytics can be used for identifying patterns in data and providing insights-based guidelines to agriculturists on how to avoid crop failure.

**Major Results** – The required regression models and classification models will be built using Machine Learning techniques and the most accurate among them will be recommended for crop insurance premium prediction and to predict to whom crop insurance can be given. Finally, Event Data Analytics model will provide valuable insights which can be used for preventing crop failure.

**Implications** – The three models built using Artificial Intelligence techniques will provide accurate results which will be fair to both the crop insurance service provider and crop insurance policy holder. They will also be customizable and affordable keeping in mind the varying needs and plight of agriculturists.

**Conclusion** – Artificial Intelligence techniques are less used by companies which provide crop insurance and other services to agriculturists. The solutions provided by the above mentioned three models will help to not only meet the objectives but also help agriculturists overcome from some of their most pressing problems.

## **Keywords**

Artificial Intelligence, Machine Learning, Event Data Analytics, Regression, Classification

## **1 Introduction**

Machine Learning is a part of Artificial Intelligence and it simulates human behaviour by imitating the way humans learn. It differs from traditional programming by learning the logic or patterns in data on its own. It is also capable of continuously learning and updating itself which in turn will increase the accuracy with which it predicts outcomes. Artificial Intelligence techniques are applied in various fields such as mining (Wang et al. (2022)), automobile, education (Ahajjam et al. (2022)), logistics and construction (Wang et al. (2022)). Event Data Analytics is used for identifying patterns in data and providing insights based on data. It consists of three components – Elasticsearch, Logstash and Kibana which is collectively known as ELK stack. Cotton yield forecasting was done using Artificial Intelligence techniques (Xu et al. (2021)). Hailstorm events can be portrayed with better precision and transparency by using K-means clustering method to enable efficient identification of homogeneous hail damage zones (Sosa et al. (2021)). Crop loss detection at field parcel scale was done using Random Forest model (Hiremath et al. (2021)). Machine Learning techniques were successful in predicting the crop yield-weather conditions relationship with better accuracy compared to traditional approaches (Schmidt et al. (2022)). Gradient Boosted Regression was used for rice yield prediction and perhaps meet the needs of insurance companies and government agencies with respect to rice yield prediction (Arumugam et al. (2021)). There are three more sections in this research article. Research Methodology, Results and Discussion, and Conclusion are those sections and they are discussed in Section 2, Section 3 and Section 4 respectively.

## **2 Research Methodology**

Descriptive Research is the appropriate research methodology for this study. The three datasets required can be got from online sources such as Kaggle, Mendeley Data etc. and 5% discount is planned to be given to agriculturists who don't avail crop insurance for 3 years continuously in order to incentivise right farming practices. Predicting crop insurance premium for crop insurance policy holders, predicting whether crop insurance can be given to an agriculturist or not and deriving insights based on the patterns in data for providing appropriate suggestions to agriculturists to avoid crop failure are the three objectives that need to be met through appropriate analysis of the three datasets using Artificial Intelligence techniques.

Regression Models such as Multiple Linear Regression, AdaBoost Regression, Gradient Boosting Regression, Random Forest Regression and Extra Trees Regression can be used for analysing the appropriate dataset and predicting crop insurance premium for crop insurance policy holders.

The model for crop insurance premium prediction is taken from (Maulidi et al. (2021)). The independent variables mentioned in the model are Regional Risk and Cultivation Time Period. Claim Frequency and Discount Eligibility are local variables which are added to the model and are independent variables. Premium is the dependent variable in the model.

**Regional Risk:** This variable denotes the probability of crop failure in a given region.

**Cultivation Time Period:** It is the time taken from sowing seeds to getting yield for a given crop.

**Claim Frequency:** It is the number of times an agriculturist has claimed crop insurance.

**Discount Eligibility:** 5% discount is planned to be given to agriculturists who don't avail crop insurance for 3 years continuously in order to incentivise right farming practices. This variable tells whether an agriculturist is eligible for discount or not based on this criterion.

**Premium:** It is the crop insurance premium to be paid by crop insurance policy holders (agriculturists).

Multiple Linear Regression is used to describe the relationship between dependent and independent variables. It can be used to determine the impact of each independent variable on the dependent variable. Multiple Linear Regression model works best when the relationship between the dependent and independent variables is linear.

AdaBoost Regression involves the use of AdaBoost concept, which is one of the pioneer boosting algorithms that assists in combining multiple weak classifiers into a single strong classifier. By default, decision stumps or decision trees with just a single split are used to build a AdaBoost Regression model.

Gradient Boosting Regression harnesses the Gradient Boosting concept, which is a popular boosting algorithm in which the errors made by the previous predictor is rectified by the current predictor. Classification And Regression Trees (CART) is the base for Gradient Boosted Trees which can be used for Regression and Classification. In our case, it can be used for building a Regression model.

Random Forest Regression utilises ensemble learning method, which works by using multiple decision trees as base for randomly carrying out row sampling and feature sampling from the given dataset in order to form a sample dataset for this model and averages the predictions made by multiple decision trees thereby resulting in better accuracy when compared to a single decision tree. Bagging which is a combination of Bootstrap and Aggregation is the basic technique behind the working of a Random Forest Regression model.

Extra (Extremely Randomized) Trees Regression makes use of multiple decision trees, but differs from Random Forest by randomly sampling for each tree without replacement resulting in a dataset with unique samples for each decision tree and a specific subset of features too are selected randomly for each tree. The Regression model built using Extra Trees Regression is characterized by diversified and uncorrelated trees.

Classification Models such as Logistic Regression, Artificial Neural Networks, Random Forest, Naïve Bayes Classifier and K-Nearest Neighbors can be used for predicting whether crop insurance can be given to an agriculturist or not based on analysis of the appropriate dataset.

Logistic Regression is a classification algorithm which is similar to Linear Regression but differs by using sigmoid function instead of linear function. The sigmoid function when pictorially represented resembles a S-shaped curve and returns an output which is a value between 0 and 1. Logistic Regression model can be used for classifying dependent variables which have two or more labels.

Artificial Neural Networks currently mark the end of Machine Learning and the start of Deep Learning. A neural network consists of three layers – input layer, hidden layer(s) and output layer. An Artificial Neural Network is the most basic neural network and consists of one to two hidden layers. The working logic of an Artificial Neural Network model is unknown.

Random Forest creates a forest with multiple decision trees and uses bagging or boosting approach to train the model built using Random Forest. In bagging approach, a subset containing unique datapoints is created and majority vote is used to determine the final output. In boosting approach, sequential models are created to improve the performance of decision trees which perform averagely or lesser.

Naïve Bayes Classifier is a probabilistic machine learning model that is used for classification and it works based on Bayes theorem. Bayes theorem helps determine the probability of happening of an event when another event has occurred. The features involved in the discussion are assumed to be independent and to make equal contribution to the final result.

K-Nearest Neighbors is a machine learning algorithm used for classification and regression. “K” denotes the number of closest neighbors to a new unknown datapoint. A model built using K-Nearest Neighbors algorithm works based on distance and filters “K” neighbors which are the least distant from the unknown datapoint.

Event Data Analytics is used for identifying patterns in data and providing insights based on data in order to provide appropriate suggestions to agriculturists to avoid crop failure. It consists of three components – Elasticsearch, Logstash and Kibana which are collectively known as ELK stack.

The model for predicting crop failure occurrence and providing suggestions to prevent crop failure is taken from (López-Sánchez et al. (2021)). The independent variables taken from the model are Production Segment, Crop, Rural Development District and Quantity of Produce. Comments is the local variable added to the model and it is an independent variable. Crop Failure is the dependent variable in the model.

**Production Segment:** This variable denotes the group to which producers (agriculturists or landlords) belong to. There are three groups namely – small producers, medium producers and large producers.

**Crop:** It denotes the crops that are cultivated by agriculturists such as sugarcane, corn, agave, avocado, tomato and banana .

**Rural Development District:** This variable gives information about the place to which an agriculturist belongs to.

**Quantity of Produce:** It is the yield produced in tons for a given crop.

**Comments:** The reasons given by agriculturists for crop failure based on their experience.

**Crop Failure:** This variable predicts whether crop failure will occur or not and provide suggestions to avoid crop failure in cases where crop failure is predicted to occur.

Elasticsearch is an Apache Lucene based search engine which is open source and developed using Java. Its port number is 9200.

Logstash is a tool used for collecting and monitoring logs from remote machines and it acts as a data pipeline for Elasticsearch.

Kibana is a data exploration and visualization tool which is used for log and time series analytics, application monitoring and operational intelligence. In ELK stack, it enables searching and interaction with data in Elasticsearch, allows performing advanced analytics and creation of reports and finally enables creation and sharing of dynamic dashboards that get updated in real-time. It is accessed over the web at port localhost:5601.

### 3 Results and Discussion

Among the Regression Models mentioned above Extra Trees Regression model can be recommended for crop insurance premium prediction. Though the most accurate model among the above-mentioned Regression Models can be determined only based on the dataset used for analysis, for the sake of argument we can assume that Extra Trees Regression model is the most accurate model. Similarly, Artificial Neural Networks model can be recommended for predicting whether crop insurance can be given to an agriculturist or not. Finally, Event Data Analytics model can be recommended to prevent crop failure by providing appropriate suggestions. The three recommended models mentioned above will be fair to both the crop insurance service provider and crop insurance policy holder in terms of premium. They will also be customizable and affordable keeping in mind the varying needs and plight of agriculturists.

### 4 Conclusion

This research article revolves around meeting three objectives namely – predicting crop insurance premium for crop insurance policy holders, predicting whether crop insurance can be given to an agriculturist or not and deriving insights based on the patterns in data for providing appropriate suggestions to agriculturists to avoid crop failure. For this purpose, three appropriate datasets can be taken from online sources like Kaggle, Mendeley Data etc. and analysis can be performed by using the above-mentioned Regression Models, Classification Models and Event Data Analytics Model. The three models to be recommended can be chosen based on accuracy and they will help to not only meet the objectives but also help agriculturists overcome from some of their most pressing problems like the need for use of technology/advanced technology (using AI for premium prediction and customizing) and affordability.

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# Impact of Technology and Workforce Challenges in Public Sector Banks in India

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## **Abstract**

*The key purpose of the report is to understand the impact of technology in the banking sectors in India and the challenges of the workforce in the public sector banks in India. In this regard, the background of the Indian banking sector has been scrutinised along with the current trends of the Indian banking sector. The use of technology in scrutinized Indian banking sectors has also been discussed in this research article. In the literature review, the factors that impact the performance of the Indian banks and the usage of information technology in the banking sector have been manifested. Apart from that, the introduction of banking and the strength of the employees in the banking structure have been scrutinized comprehensively together with the identification of the workforce challenges. In this research article, a factor analysis test has been implemented on the past data of banks to understand their promptness and capability to tackle odd situations. The findings of the test show that a maximum number of banks had to face losses for workforce challenges whereas, a few of the individuals do not.*

## **Keywords**

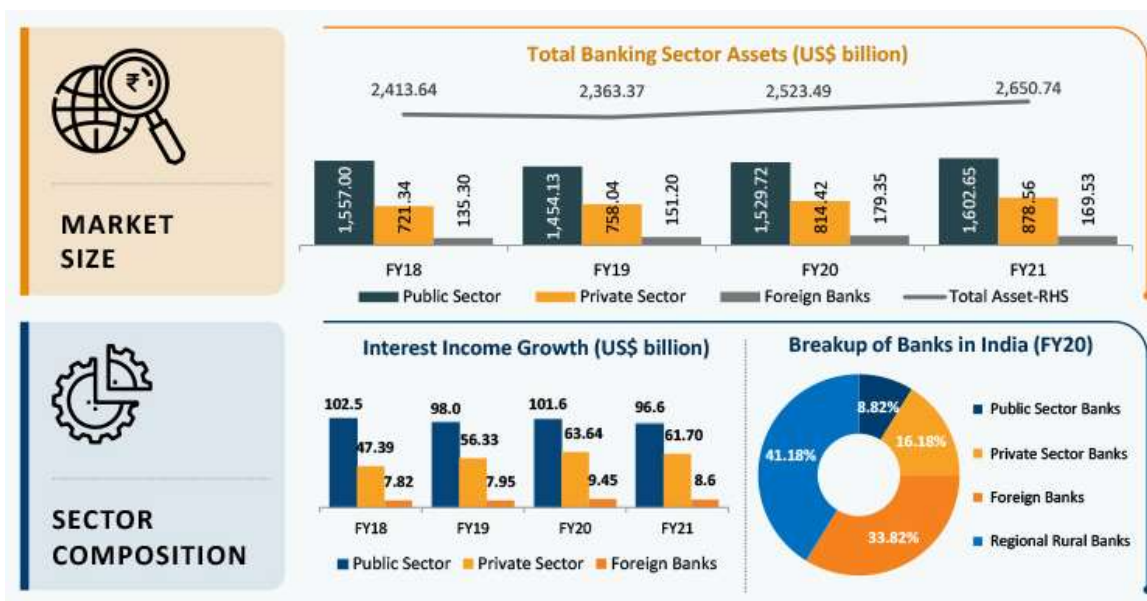
Banking Sectors, Information Technology, E-banking, Workforce Challenges, Factor Analysis, Decision Making.

## **1 Introduction**

The aim of the research article is to evaluate the effect of technology in the Indian banking sectors and the challenges of the workforce in the public sector banks in India. As a reason, in this paper, the factors that impact the performance of the Indian banks and the evolution of usage of IT in the banking sector have been comprehensively discussed. Apart from that, the introduction of E-banking in the Indian banking sector and the strength of employees in the Indian banking structure have been manifested. Whereas in this regard, the identification of workforce challenges has also been scrutinized in this paper, a questionnaire has been formulated and data collected from the bankers to perform a factor analysis test.

### 1.1 Background

According to the RBI, the banking industry of India is adequately capitalized and is well authorized. The financial and economic stance of the country is superior to any other nation all over the world. The banking industry of India has currently evidenced a rollout in the transformative banking model such as payments and small finance banks. The new measures of RBI may go prolonged in assisting the reformation of the domestic industry of banks. At current, the Indian banking structure involves “12 public sector banks” and “22 private banks”, “46 foreign banks”, 57 regional banks, and 96,000 “rural cooperative banks” (IBEF, 2022). From the time frame between 2018 and 2021, the assets of the bank have increased. The total asset of the banking industry has increased up to US \$248 trillion.



**Figure 1: Indian Banking Sector Infographics**

(Source: IBEF, 2022)

As per the reading and research of India, the credit growth is anticipated to increase by 10% from 2022 to 2023. In 2022, the UPI registered 4.62 billion transactions approximately worth Rs.8.302 trillion (IBEF, 2022). In order to enhance the infrastructure in the rural areas, 2, 04,000 PoS terminals have been authorized by the NABARD. Apart from that, the number of financial transactions through IMPS crossed 43067 million and is worth Rs.3.70 trillion in 2021. The revolution of digital payments will trigger a huge transformation in the manner credit is distributed in India. Debit cards have remarkably replaced credit cards as the preferred mode of payment in India after the instance of demonetization.

## 2 Literature review

### 2.1 Factors impacting the performance of Indian banks

The effectiveness of a bank can be considered by numerous collections of "input variables" and "output variables" (Abate et al. 2018). Productiveness, effectiveness,



profitability, and abilities are some measures that are perhaps valuable to evaluate the performance of the financial sector. Productivity is a financial expression that estimates the monetary performance of the banking sector. Bank's profitability is possibly calculated through "return on assets". A bank can be regarded as ineffective if it is not able to make the highest output by utilizing acquirable resources. Former researchers have estimated the technical effectiveness so as to assess the representation of the banking industry by utilizing the DEA and SFPFA (Aneja and Ahuja, 2021). Moreover, many studies have estimated the performance of the banking industry over the profitability of financial sectors. The profitability of all the commercial banks in India was once examined.



**Figure 2: Transformations in the Public banking sector**

(Source: IBEF, 2022)

The banking sector plays an important role in the utilization of savings and upgrading economic growth. In the recent banking industry reforms, the representation and strength of the banking sector developed evidently. Moreover, various studies have measured the performance of the banking industry in India by utilizing various backup variables such as rate of return, ROA, total profit, ROE, and business per personnel. The profitability of banks is considerably linked to equity capital, effective functioning, and the ratio of deposits in banks to GDP (Bhende *et al.* 2020). Despite the fact that credit risk, finance cost, NPA, and CPI inflation have an aftermath on the effectiveness of the financial institutions in India. It was found that "interest margin" and "Return on Assets" have a major influence on economic development.

## 2.2 Evolution of usage of information technology in the banking sector

The banking sector in India implemented information technology in their daily activities fundamentally to meet the requirement of their client.

Few factors made the banks in India utilize information technology in their functioning:

- A growing number of branches.
- An increasing amount of banking operations.
- Issues in non-automatic systems.
- Growing occurrences of frauds.

Earlier the requirement for automation and modernization was considered in the "Indian Banking system" so as to enhance the customer experience, accounting, and management information system reporting. Banks started utilizing IT primarily with the initiation of independent PCs and shifted to LAN connectivity (Chawla and Joshi, 2018). Branch banking evolved into bank banking. CBS allowed banks to improve the comfort aspect to

the client as a favourable measure towards improving customer satisfaction via "*Anywhere and Anytime Banking*". Banks have facilitated in numerous ways by utilizing current technologies. E-banking has caused cost reduction and has assisted in initiating revenue through different approaches.

The size of the client base has also maximized due to the advantage of "*Anywhere Banking*". Moreover, digitization has diminished human miscalculation or misapprehension. It is likely to reach and examine the data at any moment sanctioning a compelling reporting approach. The Reserve Bank of India has been the governing body for the Indian banks in developing rules and guidelines and providing strategies to accomplish different goals (Damodaran and Sambandam, 2018). In India, commercial banks have shifted towards technology through bank automation and modernization with the awareness of MICR subject to cheque clearing, EFT, and utilization of ATM techniques have led to favourableness of "*Anytime Banking*".

### 2.3 Introduction of E-banking

Electronic Banking is generally defined as "*internet banking*" or "*net banking*". E-banking is basically an e-payment system by means of a website that provides a range of solutions for any bank that is likely to function technologically, such as payments, deposits to own account or other accounts, transfer of funds, etc. All the banking services are fully encrypted against malware (Datta and Sahu, 2021). E-banking is a suitable approach to reach any information of an account and linked solutions connected with the account from the ease of anyone's name and proper connectivity. It has diminished the pressure on financial institutions including its customers. A client might not be required to visit the branch every time for their query, the ease of access of chatbots and customer care on the site makes it convenient for the customers as well as the bank's employees to better understand. Internet banking is well protected and easy to reach and exercise.

### 2.4 Strength of employs in Indian banking structure

The banking sector of India has encountered a rise in the intake of employees over the past five years. The sector has been one of the biggest recruiters and is anticipated to create more than 2, 00,000 jobs in the coming years. The new banking set up serving created entire two and three, and there will be a rising demand for the correspondence of business, sales executives, and banking professionals to opt into the ruler population (Ejiogu *et al.* 2020). Whilst, there is a huge growth chance, the industry is anticipated to face huge issues in the workforce. The key success of the bank relies on the satisfaction of the workers that are the biggest stakeholders of the business. The trend evolution of the strength of employees in the public sector of India has manifested an upward trend along with the aggregate transformation slope of 5%.

Therefore, the management of the workforce is one of the critical sectors of success for the banking industry. Various past literature reviews scrutinize the issues of the banking structure of India and the problems pertaining to the workforce (Haralayya, 2021). Dynamism in the banking sector in India can be attributed to the issues such as upwards direction of the rate of interest, consumer demands, financial inclusion, automotive advancement, competition in the age of human management, and effective usage of the resources of banks.



**Figure 3: Strength of employees in the Indian banking structure**

(Source: Haralayya and Aithal, 2021)

### 2.5 Identification of workforce challenges

A workforce challenge is a condition in which the probabilities cannot be adequately aligned and in which, all the contingencies of the future may not be understood. Various studies pertaining to the banking structure of India have covered the qualitative areas of workforce challenges (Haralayya and Aithal, 2021). The anticipated rise in the retirement of the senior citizens and the executives of the middle management is bound to initiate a vacuum in the pipeline of leadership. This move is probably to have reverberations continuously in the management of human resources. The public banks will encounter and president loss of expertise and competencies in the way of retiring senior and executives over the next few years.

Various research in the past had also acknowledged the leadership gaps in the public sector banks in India as palpable. The rate of growth of deposits, advances, and overall business were more than the advancement of the expansion of bank branches and the recruitment of employees (Haralayya, 2021). It manifested that the performance of the business of nationalized banks in the highest throughout the period yet the efficient variation of the bank branch addition and the recruitment of the employees were comparatively low.

The banks of the public sector and included in the pension payment, old age pension, salary, tax collection, and so on. The public banks have the accountability of obtaining a milestone of capital inclusion initiated by the administration of India (Islam *et al.* 2020). It needs new banking structures and creative ways of delivering services through correspondence in the way banks need to make the need for the new export skills. Moreover, the existing resources of human management require to be trained on the competencies needed for the future as an outcome, the banks require a concentration on recruitment, training, and advancement and retention.

### 3 Methodology

In order to analyse the impact of technology on the public sector banks of India and further to recognize the elements that are trying challenging for the workforce in the banking structure of India, an explanatory design of the research method can be used. First, the arrangement of principal factors was recognized through the literature review of the banking structure of India (Manohar *et al.* 2019). Further, to finalize the elements that are

challenging for the current workforce, a secondary factor analysis has been performed which can help in understanding the intentions and characteristics of the workforce. Factor analysis is primarily applied to interpret data and evaluate the underlying connections between the variables and other elements that may decide the challenges of the workforce. In this paper, the investigation has been performed by the scholar which is a very popular method of analysing qualitative data.

This secondary thematic analysis formulated to examine the data of the workforce individuals in various situations given in the past research, journals and websites. Here, in this paper, the use of the deductive approach has been done by the researcher to examine the validity of the presumptions at hand. This approach has the capability to generalize from the general to the particular action. Apart from that, it is assumed that research philosophy is a major topic and is aligned with assumptions, the origin of the investigation, and studies. It deals with the particular way of creating knowledge (Mutahar et al. 2018). Here, in this context, positivism research philosophy has been followed by the researcher as it is highly structured and measurements or both quantitative and qualitative.

#### **4 Findings and discussion**

Based on the understanding of factor analysis, it was stated that the two primary challenges of workforce included in the banking structure our selection issue and what is the requirement of skill. The studies of the data taken from various Indian banks and RBI on the profitability of the financial institutional sector show that these banks encounter different financial losses each year because of multiple reasons (Subramanian and Felman, 2019). Among the reasons, the insufficiency of needed expertise, problems with the selection of the workforce, and disparity in the planning of career are the most influential.

As a reason, from the results of the factor analysis, a conceptual structure needs to be created that can help in mitigating these workforce issues and help the banks to increase their profitability. Also, it is assumed that faster analysis is a multivariate approach that emphasizes on reduction and summarisation of information. With this analysis, the primary focus is to recognize the underlying latent variables driving issues in the workforce (Singh et al. 2020). The most appropriate approach accessible in multivariate data evaluation is EFA. The aim of this approach is to decide the latest structure of specific data sent by discovering general factors.

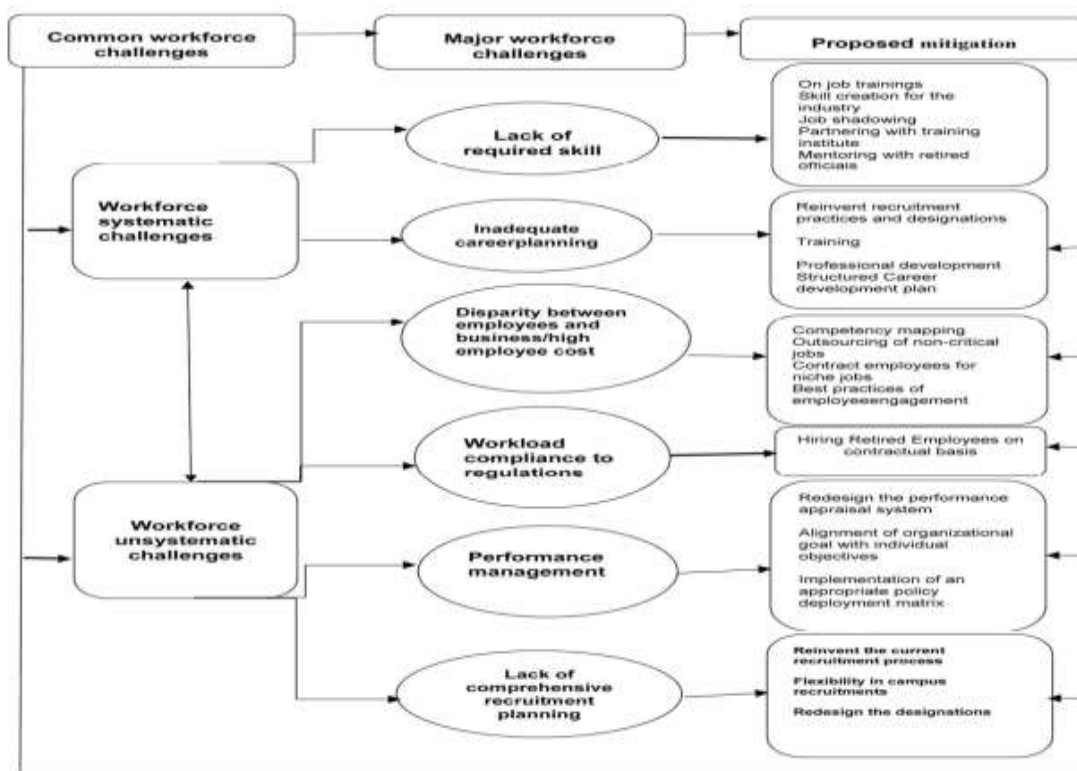
The results of the factor analyses manifest that the banking system of India is exposed to workforce issues at the varying proposition. In this part, various researchers in the past have proposed a hybrid conceptual framework approach for mitigating the challenges. However, two creative models of decision-making that have become well known universally are reviewed first prior to the presentation of the model (Tayal *et al.* 2018). The two frameworks scrutinize are “*stream analysis*” and “*learning organization*”. A more hybrid method of these two is applied in this investigation that not only provides a new conceptual method to decision making it also is prescriptive in origin as it gives a guide for action.

##### **4.1 A Recommended Conceptual Framework for Mitigation of Workforce Challenges**

A conceptual structure of mitigation of issues of the workforce for the banking sector was proposed. Depending on the LR and the opinion of the expert from the sector, two challenges relating to the problem of workforce challenges were recognized: systematic issues originating and the level of employees; and unsystematic issues originating through the system of business. These two issues were evaluated and six challenges that there is the issue further were recognized throughout the quantification of the elements in the past section (Abate *et al.* 2018). The recommended model shows tackling these two issues

simultaneously applying cause-effect connection. India has the second highest population all over the world of higher academic students and is anticipated to surpass China in the future. Despite these benefits, a huge majority of the students were unconsidered employable.

Banks require to effectively acknowledge the shortage of acute skills in the structure. In order to make the financial work environment more authorized, the adoption of new automation is a prerequisite. Due to the rapidly transforming economy with dynamic automotive advancement and skill innovation, the workers are least probable to adjust to the culture of work. The loss of banking operations due to human errors is approximately 7% in the banking sector of India (Aneja and Ahuja, 2021). In order to reduce these kinds of losses, the worker should be well managed and trained with the current automations and need to acknowledge the impact of human errors on banking profitability. These institutions may also acknowledge these problems to avail structured analysis of training needs and set targets for days of training.



**Figure 1: Conceptual model for mitigation of workforce issues**

(Source: Bhende *et al.* 2020)

The “Banking Regulations Act” enables banking workers to work for up to 60 years. Subordinates are required to take the charge rapidly after the requirement. This process is followed as a routine transaction rather than as a prerequisite system of grooming. Whereas, on job training is implemented by the retired workers on a contractual basis back up the grooming of the existing employees at an optimum cost of training (Bhende *et al.* 2020). The report of the bank committee on issues of HR of public sector financial organizations mentioned that the banks need to strengthen their HRM with particular thrust on those domains such as recruitment, PA, promotion, and rotation. RBI has created certification is required for domains like treasury operations, risk administration covering, credit risk, liquidity risk, and so on. These financial institutions are free to create a certification that is necessary for other domains of work as well.

RBI is also structuring to create and delegation agency for presuming and licensing initiatives of learning within the financial industry. The current process of selection in the banking areas of India is quite particular. However, a few ambiguities have been observed in the selection of employees. There should be a few rationales prior to the selection of workers such as great, competency over domains, multiple skills, and so on (Chawla and Joshi, 2018). The recent process of selection in the Indian banks is more concentrated on the educational background rather than on core competencies. Whereas, the banks in the public sector have been encountering challenges in HR because of the recruitment freeze in 1990.

Yearly retirements in the previous times have met a leadership vacuum in the higher authority. Because of the demand for particular skills, the banks in the public sector were recruiting highly professionals such as IIT students, leaving the positions vacant. Further, the financial institutions were not capable to pay competitive salaries for those employed individuals to campus recruitment for particular skills (Ejioguet *al.* 2020). Because of the automotive advancements in the recent banking domain, it is required to re-observe the recruitment criteria, having more emphasis on automotive skills. Hiring should not be restricted to the entry-level and should be divergent into every area. The recent practices in the banking structures of India concentrate not only on entry while it also has the middle and senior level posts to offer.

Any scheme related to incentives with a huge guarantee of business will promote a high level of performance in HR. Similarly, the penalty and other compensation will also assist in avoiding omission, that intern in hands is productivity and efficiency in the business of banking. Employees creating a remarkable contribution to the performance for these objectives needs to be entitled to the performance-associated incentive. Thus, banks would be needed to install and execute a powerful and credible PMS (Haralayya, 2021). Along with the advent of automation and expansion of profiles of work, there are few profiles in the business of banking that have the scope of employment for a very short time such as financial year schemes. Also, for particular jobs getting individuals is sometimes a critical job and hence banks generally recruit such individuals on a regular basis which makes huge financial distress in the banking structure.

Solutions to particular skills pools are the requirement to be dealt with by any area related to construction workers for a specific time. Cooperating with academic Institutes may assist the banks to obtain skills based on the profiles of the job (Islam *et al.* 2020). As the courses formulated by academic institutions are in cooperation with the banking sector workers, the training duration of fresh employees will be diminished which means also serve the expenses for the banks.

## **5 Conclusion**

The research question tried to analyse the role of technology in banking sectors in India and the challenges of the workforce in public sector banks in India. In this regard, a factor analysis test has also been imposed on identifying the issues of the individuals and bankers. In the discussions made in the paper interpreting the issues of the bankers and the past data of various banks and RBI, it is obvious that a maximum number of banks showed a very compatible and alarming data to handle critical situations. The data of these financial institutions in India manifested that there are 3 primary issues that impact the profitability of the banks. It also helps understand the features of the banks and rational course of action which impacted the decision-making of those institutions. The findings to the analysis manifested that a maximum number of banks are good at handling the situation of losses and which is positive for the performance and profitability of the

organizations. Whereas, a few data also showed negative results. By reflecting on the discussions made in the paper along with the identification of the workforce challenges, the strength of the employees in the banking structure, and the use of information technology, it is obvious that the banking sector of India needs to take considered the block chain process for making positive effect on the financial services sector and should also consider the E-banking operation. Moreover, the conceptual framework for mitigating the issues identified through the factor analysis has also proposed here.

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# Customer Intentions to Adopt Mobile Wallet in Online Shopping

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## **Abstract**

*Smartphones are new generation gadgets as they offer huge merits to end users in their routine life. End user is deriving unlimited assistance from smartphones in exploring the opportunities to fulfil their wants and desires. The ease of making payment is one such merit from mobile phones where customers have many options to make payment to the seller or service provider in the market. It is always fascinating to scan the mind of customers to trace their intentions while using mobile payments. End users have their options open to choose from different payment options using mobile phones. One of such online payments option is mobile wallet, which can help the customers to clear the payments with ease. This empirical research focuses on exploring the intentions of end users to use mobile wallet as payment mode while shopping online and to determine the major influencers of end user behaviour.*

**Keywords:** Intentions, end user, online shopping, mobile wallet, online payment

# Artificial Intelligence in Business

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## **Abstract:**

*The replication of human scholarly cycles by machines especially PC frameworks is alluded to as Man-made brainpower. It is the science and design of making clever machines, especially canny PC programs. It is closely resembling using PCs to fathom human keenness, yet artificial intelligence doesn't need to restrict itself to physiologically perceptible techniques. Goal is to create computer programs that can solve challenges and achieve targets in the real world and for humans. AI has emerged as a revolutionary trend in many fields and even boosted the economy's efficiency. We commonly incorporate AI in our daily operations without fully comprehending what it is. For - model an email auto-filling highlight, requesting that Alexa switch out lights, play out a google search to receive an Amazon item suggestion, or book an excursion on the web, computer-based intelligence is prowling behind the scenes.*

*The qualitative research approach will be used in this framework to help understand the breakthrough and usage of AI in various functional areas of Business. AI is used in various business activities, and it is helping the organization to achieve efficiency. AI has shown an astounding impact on all functional areas of business. AI is used in performance marketing for social media, Chatbots, and automated ad buying and placement. As the monetary area recognizes the productivity and precision of artificial intelligence, it is quickly consolidating versatile insight, algorithmic exchanging, and AI into monetary cycles. On other hand, AI has an outstanding manifesto on Sales through Virtual Assistants, Graph Analytics. AI also has applications in Human Resources via Repetitive Task Automation, Bias Reduction. This conceptual Research paper offers an elliptical overview of the most recent studies highlighting the use of AI in Business.*

## **Keywords**

Artificial Intelligence, Human Intelligence, Science and Engineering, Business, Functional Areas.

## **Introduction:**

What is Artificial Intelligence?

"Man-made brainpower" inspires unmistakable inclinations. For a certain something, our distraction with mind seems to give us people a one-of-a-kind spot among living structures. Questions, for example, "What is knowledge?" and "How might insight be estimated?" arise. "How accomplishes insight work?" This multitude of requests is appropriate. While endeavoring to grasp man-made brainpower, in any case, the central point of contention for the specialist, especially the PC researcher, is an issue of knowledge. A computer that acts keenly and acts like an individual. The characteristic

fake might inspire many affiliations. It imparts dread of insightful cyborgs. It reviews symbolism from sci-fi writing. It raises the predicament of whether we ought to try to appreciate, model, or even reproduce our definitive great, spirit. With so many distinct meanings, it's challenging to describe artificial intelligence (AI) clearly and rigorously (Ertel & Black, 2018). The essential downside of portraying computer-based intelligence as simply "making savvy machines" is that it doesn't make sense what artificial intelligence makes a machine clever (McCarthy, n.d.). Man-made brainpower (man-made intelligence) alludes to robots' ability to copy or work on human knowledge, for example, thinking and experience-based learning. Man-made reasoning has for some time been used by software engineers; however, it is likewise being utilized in many various items and administrations. A few computerized cameras, for instance, may utilize man-made reasoning calculations to observe what items are there in an image. Moreover, specialists expect that man-made reasoning will be utilized in different novel courses from here on out, including savvy energy networks. To appreciate the idea of simulated intelligence, consider what separates our insight from those of different animals: our ability to gain from preliminaries and apply what we've figured out how to new conditions. People can do this due to our prevalent mental ability; we have a greater number of neurons than some other creature species. Man-made intelligence permits you to focus on the most critical exercises and go with more brilliant choices considering the information gathered for a particular use case. It can do troublesome errands, for example, gauging support needs, identifying Visa extortion, and deciding the ideal course for a conveyance vehicle. As such, artificial intelligence can computerize various business exercises, permitting you to zero in on your center abilities. Control, arranging, and planning are models, of the ability to answer demonstrative and customer inquiries, penmanship, normal language handling, insight, discourse acknowledgment, and the capacity to move and control things (Abhishek, 2022). In an essence, artificial intelligence (AI) delivers slashing technology to cope with complicated data that an individual cannot handle. AI automates repetitive operations, allowing individuals to concentrate on elevated, value-added tasks. When AI is used on a global level, it minimizes costs while boosting profitability.

### Artificial Intelligence in Business

In an unstable and convoluted business climate, new computerized innovations are reshaping the economy's geology, hierarchical highlights, and the manners in which individuals draw in with firms. As a fourth Modern Unrest gas pedal, Man-made reasoning (simulated intelligence) will represent a huge test to hierarchical administration frameworks (Just a Moment. . . , n.d.).

Man-made consciousness (artificial intelligence) is everywhere. You've presumably used it during your normal drive, to ride the web, or to check your new online entertainment feed. With the steadily expanding amount of information available today and clients' consistently changing requests and intricacy, organizations can't depend on dated business ways to deal with making progress. With simulated intelligence, these extraordinary movements have opened an entirely different universe of opportunities for driving corporate accomplishment through significant knowledge made from buyer information. In business, man-made consciousness essentially connects with the utilization of astute programs with human-like attributes to raise income, further develop client experience, increment efficiency, and effectiveness, and drive corporate turn of events and change. (Kole & Kole, 2020c). Artificial intelligence innovation might be utilized in many businesses, including medical services, deals, HR, activities, assembling, showcasing, and innovation. The valuable open doors for business are boundless. Notwithstanding, to

integrate computer-based intelligence and AI innovation into organizations, we want a labor force that can deal with the innovation.

Business tasks in the twenty-first century are portrayed by an elevated degree of intricacy, containing exercises that are unsavory and wasteful for people to do. Information time has assumed control over business in the present globe. Information might give organizations valuable experiences in strategies that can altogether support business. Accordingly, in the present business climate, associations should comprehend their shoppers' needs and inclinations to develop and stay important notwithstanding extreme contest. Organizations may now involve man-made consciousness in business to comprehend and connect with buyers, mechanize organization tasks, and increment efficiency and income while bringing down working expenses more readily.

#### Business Instances of Artificial Intelligence

The contemporary information period has powered the development of a few man-made consciousness applications in business, for example, information examination, custom-fitted business administrations, and robotization.

The following are a couple of instances of business utilizations of man-made brainpower: Uses of computer-based intelligence in the life of work the executives include:

- Spam detectors
- Speech-to-text features intelligent email categorization
- Shrewd individual collaborators like Siri, Cortana, and Google Presently mechanized responders and online client care process computerization deals and business anticipating security reconnaissance savvy devices that adjust considering conduct robotized bits of knowledge, especially in information-driven areas (e.g., monetary administrations or internet business) (NI Business Info, n.d.).

- **Man-made consciousness in Client Relations**

One more argumentative illustration of man-made reasoning in business is the supplanting of people with computer-based intelligence in client service. Clients may now speak with firms progressively to address concerns, place buys, gain experiences, and do almost all that they would request from a visit with a well-disposed client individual, because of the presentation of chatbots. As per Gartner, by 2020, 85% of client contacts will be overseen without the contribution of a human. This leading-edge man-made reasoning in business development will wipe out the requirement for individuals in client cooperations, bringing down operational expenses and tremendously upgrading client care openness and conversational experience.

- **Business Skill**

Finding experiences from the information may be troublesome with the rising measure of accessible corporate information. This has brought about the broad utilization of computerized reasoning in business knowledge to extricate significant experiences from the information. These bits of knowledge help organizations in further developing advertising adequacy, better-grasping purchasers, portioning to give custom-fitted encounters, creating business procedures to improve corporate direction, and utilizing computerized reasoning in an organization the board. There are a few innovations accessible now that apply man-made brainpower to business knowledge. Microsoft Power BI is a well-known application that assists organizations with getting vital data to figure out which systems and activities generally affect organization KPIs. Moreover,

coordinating AI capacities inside Power BI might help firms in making AI models deliver significant figures and expectations from information and mechanize business activities.

- Artificial intelligence for optimization

One more utilization of man-made intelligence that traverses areas and corporate activities is streamlining. Computer-based intelligence-fueled business applications might utilize calculations and models to change information into significant bits of knowledge on how organizations can enhance various capabilities and business processes, going from specialist planning to assembling item valuing.

Usage of Artificial Intelligence in Marketing:

Promoting is a kind of collaboration between an organization and its customers with the target of selling them items or administrations. Items are not completed until they arrive because of clients. Promoting is the administration cycle by which items and administrations are conveyed. Administration's progress from idea to the buyer. Showcasing is less worried about drawing in clients to pay for an item as it does with encouraging interest for that ware and fulfilling that need client's necessities. As indicated by the American Promoting Affiliation (AMA) Top managerial staff, Advertising is the movement, set of establishments, and cycles for making, conveying, conveying, and trading contributions that have an incentive for clients, clients, accomplices, and society at large. Dr. Philip Kotler characterizes showcasing as "the science and craft of investigating, making, and conveying worth to fulfill the requirements of an objective market at a benefit. Showcasing distinguishes unfulfilled necessities and wants. It characterizes, measures, and evaluates the size of the distinguished market and the benefit potential. It pinpoints which fragments the organization can serve best and it plans and advances the suitable items and administrations" (Chaudhury, n.d.). Consequently, advertising envelops all endeavors engaged with the development of the area, time, ownership, and mindfulness utilities, as well as others.

When was the last time you booked a plane ticket for a business or leisure trip? Whether you booked it yourself or asked your assistant for assistance, you've probably seen that costs differ across flights to the same location with the same set of extra services. The reason for this is that airlines employ dynamic pricing, which is one of the most prevalent uses of AI in marketing. AI is used by companies in a variety of industries, including airlines, hotels, and ride-hailing apps, to modify the cost of their operations to account for factors like as supply and demand, whether it is demand for seats on an aircraft, hotel rooms at a certain facility, or vehicles. The primary objective is to earn more money with the available limited resources. Recent advancements in artificial intelligence (AI) and increasing amounts of data provide marketing and sales professionals with multiple options to harness technology to streamline processes and, eventually, cut corporate operating expenditures. In this literature, we'll go through how AI can help with marketing and how your company may profit from it.

So, what function does AI play in marketing, and how does it impact company KPIs?

According to a HubSpot survey, marketing experts spend an average of 16 hours each week completing regular chores. This covers duties such as inputting lead information into a CRM system, comparing rivals' rates on comparable products and services, responding to consumer queries in chats, segmenting clients, and so on. Sixteen hours is over half of a typical workweek. This is where CMOs can step in. Integrating artificial intelligence into marketing divisions and allowing algorithms to take over regular activities liberates resources for more creative work. Gartner Inc., IT research, and consultancy group predicts that worldwide AI investment would reach \$62.5 billion in

2022, up 21.3% from 2021. Marketing and sales will receive a fair amount of this money. According to McKinsey's recent global AI study, marketing is one of the top three categories where AI has been widely used in recent years. In 2021, the most significant growth in the application of AI will be in organizations' marketing-budget allocation and expenditure effectiveness. Over 33% of study respondents indicated AI use cases in marketing and sales, with 17% reporting AI use cases in customer service analytics and 16% reporting AI use cases in customer segmentation. Likewise, promoting and deals saw one of the biggest year-over-year changes in the offers announcing cost takeout. That's hardly surprising given that applying AI in marketing allows professionals to detect which advertisements make more income than others, identify diminishing CTRs in real-time, and even predict changes in consumer behavior.

Then, depending on the data changes, they may thoroughly investigate each situation. These applications, together with other data-driven efforts, promise to enhance product or service sales by more than 10% ("Using AI in Marketing: Top 5 Cases & Examples," 2022).

- Web composition

Man-made intelligence might help advertisers in the scope of purpose cases, including the production of a site, right from the beginning of the showcasing system. The Network utilizes a simulated intelligence named Molly to make sites, and a couple of designers are as of now using Stages "she" has made. What is the Network's offer? Molly can make sites in a small part of the time and cost that utilizing a group of designers and computer programmers would require. The Framework costs under \$100 each year for one site, which is a take when contrasted with compensation. Designers might enter material into The Lattice, like photos, text, and suggestions to act, and Molly will plan the site utilizing artificial intelligence

- Creating Content

Content authors might accept their vocations are secure from artificial intelligence substitution, and until further notice, this is for the most part exact. In any case, advancements like Scribe and Plume are as of now being used by associations, for example, The Related Press and Forbes to create intelligent news material. These projects might deliver unique composed material that peruses like it was composed by an individual by involving layouts and fill-in-the-spaces to add relevant information and catchphrases. (Albeit not a Pulitzer Prize victor, the words and storylines check out.)

- Voice Search

Man-made intelligence has proactively affected how buyers perform web looks, which is changing the way that advertisers create and Upgrade content. Voice search and Google's Position Cerebrum are two significant computer-based intelligence improvements that have changed web searches and site improvement. Amazon Reverberation, Google Home, and Apple's Siri are instances of developments that make it simpler for people to look with the press of a button and voice orders. That suggests the expressions individuals use to look are changing too; rather than placing ready "cafés in Boston," clients may rather ask a device, "where would it be advisable for me to go to supper this evening?" (Bernazzani, 2019).

- Push notifications

With behavioral customization, push notifications may be adjusted to individual users, ensuring that they receive the most relevant message at the most opportune time.

- Image Recognition

PC Vision empowers PCs and frameworks to construe significance from computerized photographs, recordings, and other visual sources of info and afterward act or suggest fittingly. Advertisers might utilize this to investigate the large numbers of pictures posted via online entertainment stages consistently to procure data about how and where items or administrations are utilized. Market entrance and brand mindfulness may along these lines be measured in original ways (7 Applications of Artificial Intelligence in Business, n.d.).

Utilization of Man-made consciousness in HR:

HR offices used to be for the most part managerial in nature. The significant elements of staff divisions were administrative, and work in the HR division focused on record continuing to respect the representatives. Be that as it may, perspectives toward HR have moved decisively in the past 30 years. As per research, what firms deal with their representatives has a critical mean for how successfully they capability. Today, the expression "key HR" alludes to HR procedures that give firms an upper hand. There has been an adjustment of the essential HR development in HR's center moving from managerial techniques to undeniable level administration execution HR methodologies, for example, joint effort and execution assessment of the executives that spotlight on center occupations as opposed to all positions zeroing in on fundamental laborer bunches as opposed to each specialist. As of not long ago, the significant benefit of innovation was expanded productivity; it permitted us to play out the same things we generally did, yet quicker and at a lower cost. For instance, prior, innovation permitted us to select individuals even more rapidly through the web, however, today artificial intelligence permits us to enroll the proper people more rapidly by breaking down expertise fit for positions, projecting future execution, and working out the normal chance to fill any given post. This is an illustration of how artificial intelligence is changing the situation with the end goal that innovation assists the HR with working location urgent business concerns, developing past commitments from labor force examination. Though earlier HR drives brought about gradual change, computer-based intelligence considers remarkable execution expansions in HR (HR.com Limited, n.d.). Human asset experts are working in a totally different setting than they were before the Coronavirus episode. As the quantity of crossover and distant labor forces develops, virtual enrolling, as well as a more noteworthy accentuation on variety and incorporation, have presented new elements and reinforced old ones. To stay cutthroat, new stages and advancements are essential, and artificial intelligence is at the very front of this extension (Applications of Artificial Intelligence in Business, n.d.).

Today, simulated intelligence's abilities are being utilized to expand business tasks and purchaser arrangements. We have distinguished a couple of essential purposes behind executing simulated intelligence in HR:

- To settle squeezing business challenges

Simulated intelligence empowers HR associations to convey new bits of knowledge and administrations at scale without swelling headcount or cost. Relentless difficulties, such as having individual's assets to follow through on the business procedure and distributing monetary assets, as needs are, can be tended to through the smart use of computer-based intelligence arrangements.

- To utilize HR reserves

Man-made intelligence can assist HR with turning out to be more effective with its funding. HR spending might be redistributed to higher-worth and more confounded issue arrangements while keeping up with administration levels for workers who have more normal HR questions. HR reserve funds might be reinvested in more artificial intelligence execution, improving HR's ability to tackle business challenges, constantly construct key capacities, make great work encounters, and give better choice help than individuals (HR.com Limited, n.d.)

- Organization Network Analysis

To help your organization become more sustainable and effective, AI may be used to assess formal and informal business ties, which can aid in the development of business strategies that promote the organic exchange of information (7 Applications of Artificial Intelligence in Business, n.d.).

- Learning & Development:

Artificial intelligence analytics examine your workforce's abilities and identify employees whose competencies are on the verge of becoming obsolete. AI may then construct and offer a customized development plan for those team members to reskill them. In today's innovative economy, everyone must be constantly learning. AI solutions provide personalized learning programs to ensure that all employees gain new skills, increase productivity, and believe their organization has prospects for advancement. You can also utilize these solutions to make employee coaching easier. Similarly, AI may aid with career pathing and recommendation engines by suggesting appropriate classes or highlighting jobs that provide opportunities for growth. When combined with AI, virtual reality has the potential to give life-like, immersive simulations and training (Sahni, 2019).

#### Usage of Artificial Intelligence in operations

The organization of cycles that create or convey items and administrations is alluded to as tasks on the board. Only one out of every odd association will have a practical division assigned to "tasks," yet they will all take part in certain exercises. Since each association makes items and additionally benefits and offers types of assistance. The activities chief will supervise dealing with the assets utilized in this strategy. Activities positions have a few titles and may contrast across modern and administration enterprises. A planned operations director and a modern designer are two instances of blue-collar position titles. In the help business, models are activities control directors (who timetable trips for carriers), quality administrators, inn chiefs, and retail supervisors (Greasley, n.d.). Dynamic speed, process duration decreases speed, functional speed, and nonstop improvement speed of computer-based intelligence in the store network are staying put and will cause disturbances before very long. As per Gartner, store network firms anticipate that machine computerization should be fourfold in their production network exercises over the course of the following five years. Simultaneously, overall spending on IIoT Stages is supposed to ascend from \$1.67 billion in 2018 to \$12.44 billion in 2024, addressing a 40% build yearly development rate (CAGR) over the course of the following seven years. Boosting efficiency by diminishing vulnerability is the top target across areas in the present connected advanced climate. Expanding assumptions for supersonic speed and proficiency from providers and colleagues of different kinds underline the business' need to utilize the abilities of Computerized reasoning (simulated intelligence) in supply chains and planned operations (Man-made consciousness (man-made intelligence) in Production networks and Coordinated factors, 2022).

Utilizing Computerized reasoning (computer-based intelligence) in Supply Chains and Coordinated factors to Pick up Store Network Speed



Simulated intelligence in supply chains is aiding the conveyance of strong advancement abilities fundamental for more exact scope quantification, expanded efficiency, top caliber, decreased costs, and higher results, all while empowering more secure working circumstances. When faced with a pandemic like Coronavirus, they affect stockpile chains and the possibility of arranging can help to produce organizations in managing vulnerability in a legitimate way. All in all, what does man-made intelligence suggest for firms endeavoring to make a return while zeroing in on production network efficiencies?

- Improved IT operations

Simulated intelligence applications that utilize AI might assist firms with setting aside a great deal of cash. Computer-based intelligence can possibly robotize network safety and programming upkeep tasks. It can likewise recognize potential risks quicker than people, which could save organizations from digital attacks. Simulated intelligence programs help IT, experts, with framework upkeep and keeping things running appropriately (7 Applications of Artificial Intelligence in Business, n.d.)

- Digital Transformation

Organizations all through the world are forcefully embracing new innovations. Whether in banking, travel, medical care, or online business, business activities are being robotized by first digitizing them and afterward permitting individuals to utilize applications in view of new advances. Advanced mechanics and blockchain innovation can assist with data the executives, while AIOps decline IT functional grating (7 Applications of Artificial Intelligence in Business, n.d.).

#### Utilization of Man-made brainpower in Finance

To fulfill their requests in the monetary world, organizations require funding. Finance is vital for an organization's activity. Accordingly, it is alluded to as the business backbone association. Whether an organization is enormous or little, it expects subsidizing to work its business movement (Paramasivan & Subramaniam, n.d.).

Consider the following scenario. You've just discovered a new way to improve the flavor of coffee beans. You and a few buddies decide to start and operate a small firm called Coffee Ventures to process and promote your new coffee brand. In addition to being the company's managers, you and your friends are the primary shareholders—you are also the company's owners. Before you can begin your firm, you must make several important financial considerations. Obviously, you must select which necessary assets, such as buildings and equipment, must be obtained. These assets will be expensive, and their overall cost will equal the amount of your initial company investment. In financial terms, this is referred to as a choice on investment. A second, related choice is how to fund this investment. Obviously, you cannot purchase the assets unless you have the requisite funds. There will be a lot of questions to think about. These are likely to include questions such as, "What is the best approach to fund this investment?" Who will supply funding? What will the cost of raising be? This is the fundamental character of a funding choice (Staff & Mckenamin J Staff, 2004)

As per Wheeler, "Business finance is that business action which worries with the procurement and discussion of capital supports in addressing monetary requirements and in general goals of a business endeavor" (Paramasivan & Subramaniam, n.d.).

With the quick development of man-made brainpower innovation, artificial intelligence is turning out to be progressively famous in the monetary area. Factors that speed up Fintech development, support the improvement of computerized reasoning and AI in the monetary circle, and lead monetary organizations to utilize man-made intelligence to diminish costs, control risk, improve administration quality, and lift benefits (Xie, 2019).

- Lending

#### Operations of Retail Lending

Document capture technology enables financial organizations to automate their credit application evaluation operations. Why continue the time-consuming process of manually examining pay slips, invoices, and other financial papers when AI algorithms can seamlessly manage these processes, automatically record document data, and conduct financing activities with minimum human involvement? This would undoubtedly help banks and financial organizations process credit applications more quickly and with fewer mistakes (Rangaiah, n.d.).

- Artificial intelligence in Hazard The executives

In the monetary world, time is cash, yet chance might be lethal while possibly not appropriately made do. Exact estimating is basic to the speed and security of many ventures. AI is progressively being utilized in monetary business sectors to produce more exact, deft models. These estimates help monetary experts in using current information to detect patterns, recognize gambles, save work, and guarantee better data for future preparation. The organizations recorded beneath are only a couple of examples of how man-made intelligence is helping the monetary and banking areas in further developing estimates and chance administration (Schroer, 2022).

- Recognition, the executives, and avoidance of extortion

Have you at any point gotten a call from your charge card organization subsequent to making many buys? As per Towards Information Science, extortion identification frameworks utilize computerized reasoning to look at an individual's buying movement and give a caution in the event that something shows up out of the standard or goes against your traditional ways of managing money (Artificial Intelligence in Finance [15 Examples], 2022).

#### Case Studies

➤ Epiq On Amazon Augmented AI

Law offices, ventures, monetary establishments, and government organizations across the world depend on Epiq for legitimate and business administrations. One of their most noticeable administrations is court translating. Since human-based recording takes time, they decided to increase activities by utilizing simulated intelligence to mechanize records. "Very quickly, Epiq made an AWS-controlled record arrangement that is 5% more precise than contending outsider record motors," says Epiq's VP of Designing, Wear Youthful. "We use AWS Step Capabilities as a transformation apparatus to effectively computerize the various cycles inside our framework, and the record is a motor"

#### Industry – Professional Services

Amazon Interpret, Amazon Increased simulated intelligence, AWS Step Capabilities, and Amazon Flexible Process Cloud are man-made consciousness contributions.

#### Outcomes:

- Provides courtroom transcriptions with an accuracy rate of 85%.
- 5% more accurate than traditional instruments
- Support in several languages
- In three months, I created an e-discovery system (Ot, 2021).

➤ Starbucks Consolidated Prescient Examination and Concocted Customized Proposals

As indicated by a review, all associations that esteem prescient examination increments their deals naturally by 21% each year; that's right, you read it accurately. Without the utilization of prescient examination, it just develops by 12% by and large, which is a little increase.

Starbucks is a worldwide illustration of a brand that has coordinated its devotion card and portable application to assemble and dissect information from different clients. They have faith in uniqueness and creativity and take special care of their customers in like manner. They worked on their application experience, kept up with the track, everything being equal, and fitted correspondences to clients.

The award:

- Proposals on different things
- Illuminating them on what suits their character and what drinks or exercises to endeavor.
- Expanding a client's requesting esteem.

Starbucks achieved all of this with the prescient investigation and impeccable simulated intelligence promoting incorporation. How great is that? (White, 2021).

➤ AI + Automation: Nestle Feeding Recipe for Innovation

Carolina Pinart, Nestlé's Group Head of R&D Information Technology, and previous AI Program Lead understands firsthand the need for continuous technological innovation in the consumer-packaged goods (CPG) industry. One of Pinart's primary roles at Nestlé, which has over 2,000 brands worldwide, is to integrate developing technology into its products and business processes. In recent years, the firm has used AI and automation to improve its production and R&D processes and generate new product concepts.

Pinart highlighted a variety of tech subjects in a recent webinar with Unable, including:

- AI and automation are skeptical.
- Things a company should think about before integrating AI.
- Nestlé's approach to technological innovation.
- How to persuade internal stakeholders to invest in artificial intelligent

Examples of how AI automation is used at Nestle

If we can automate to minimize risk and expenses while increasing income, we will leverage AI and machine learning to assist the company.

In our plants, we employ predictive maintenance automation via machine sensors that trigger an alert if something goes wrong. We also utilize predictive models to make troubleshooting more efficient, because unmonitored troubleshooting will cause the manufacturing line to stop unnecessarily. We save money by using chatbots to automate first-line customer care. We also employ chatbots with our supply chain partners to assist them in locating internal resources and documentation. To give you an indication of the

scope and diversity of AI use cases at Nestlé, when I oversaw the AI program, we handled over 500 AI projects representing 45 distinct use cases.

Would you think the AI you've been employing has aided Nestlé in making faster decisions?

Absolutely. Not only has AI aided us in making faster judgments, but it has also revealed previously unknown insights. For example, we've utilized AI to identify trends on Chinese social media sites and then recommend product possibilities based on those online chats. This is frequently faster and more informative than purchasing industry research from analyst companies (Dimas, 2022).

## Conclusion

Any new technology's success is determined by the individuals and organizations ready to accept it. To date, the AI revolution has primarily occurred in the software and gaming industries. However, as the cost of sensors and displays continues to plummet, more industry leaders are likely to use the technology. With the surge in digital content generation, massive volumes of data about consumer preferences and usage habits are being acquired. Media behemoths like Google, IBM, and Facebook have built their empires on the purchase and sale of this data, which can be segmented and used to derive conclusions about the general population and the individual. This permits them to enhance their services, give marketing solutions, and create content for their users. AI has evolved into a crucial tool for collecting, filtering and analyzing valuable consumer data. Using Neural Networks, these AI approaches may learn about consumers' use patterns and behaviors without any human intervention. Maintenance industries employ Genetic Algorithms and Neural Nets to develop scheduling solutions that enable businesses to automate content publishing and work schedule. Although the application of AI in marketing is quickly expanding, AI technology is still in its infancy. Today, AI is not required for a business's success; but it may assist organizations in automating menial or repetitive jobs that consume people and expenditures. It also assists companies in detecting patterns that might otherwise be difficult to discern with the naked eye. AI may not yield positive results for every company but examining its possible place in the company's work mechanism can be the key to gaining a competitive advantage over its rivals. (Nordlander, 2001)

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# Exploring the impact of technostress on academic performance among undergraduate students : A hybrid partial least squares-artificial neural network modelling approach

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## **Abstract**

*Technology induced stress have found significant negative impact at workplace. However, lack of attention was paid by the researchers in the academic setting. Therefore, aim of this paper is to test the influence of technostress in terms of information overload(IO), social overload(SO), communication overload(CO), work overload(WO) and work-life conflict(WLC) on academic performance (AP). This study tested these relationships by developing a research model and empirically validating it, based on the technostress theory and conducted a survey among 228 undergraduate students. To evaluate and validate the results, the study adopted a two stage, hybrid model using partial least square-structural equation modeling and neural network modeling. Result indicates, there are significant impact of IO, CO, WO and WLC on AP. Further, the artificial neural network result shows that work overload is the strongest predictor. We also discussed several new and useful theoretical and practical implications for reducing technostress among students.*

# Big Data Analytics on Determinant Factors of Agricultural Productivity

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## **Abstract**

*There has been wondrous growth in Science and Technological tools in the last two decades and by focusing the use of this technology towards agriculture, amazing results can be obtained. Big Data is one such tool which can have a high positive impact on agriculture and agricultural products. Big Data can be used to trace the soil type, seed quality, irrigation levels required during different periods of crop life cycle and weather information that impacts any type of agriculture. Since data can be collected over numerous agricultural typology information pertaining to various diseases affecting different varieties of crops can also be plotted. Through Big Data one can determine the right agricultural inputs, monitor the parameters affecting the crop growth and commercial aspects like finding the current price and selling points for the product. In a few countries the latest technology such as drones have been used to survey and collect agricultural data. But that might not be the final frontier. Large amount of data pertaining to large areas of cultivable lands where varied crops are grown must be collected, grouped and analysed. The accurate farming method which will result from such an analysis will provide information, tips and techniques for water management, irrigation, higher productivity, waste management and positive environmental impact. It is fitting to use tools such as Big Data for a country like India which offers large amounts of agricultural data.*

**Key Words:** Big Data, Agriculture, India, technology, Information, Tools.

## **1. Introduction**

Agriculture is considered to be one of the major sectors of any nation and particularly for India. Agriculture can be termed as the backbone of the economy as well as the global economy. The majority of rural residents depend on agriculture for their livelihood. Agriculture supplies for food, energy, medicine and so on [1].

Today, the agriculture sector is facing several challenges such as climate change, increasing population, increasing labour shortages, land and water constraints, increasing urbanization, environmental degradation, changing dietary habits, comparing with the latest technology, and so on. Due to which it suffers from a huge number of unpredicted natural disasters such as climate change, lack of or irregular monsoon, droughts, floods. The United Nations has estimated that the global population will reach 9.8 billion by 2050, indicating the urgent need to produce more food in order to feed the growing population with less land to grow it on. We can overcome these challenges through adopting advanced technologies such as the Internet of things, cloud computing, GPS technology, satellites, drones, robots, and artificial intelligence [2]. Nevertheless, the time has come for technology to take over the transition and to resolve this situation.

These technologies are transforming agriculture into a new dimension and thereby generating massive volumes of data that can be termed as big data. Agriculture has gone through several revolutions, like industrial revolution, green revolution, biotechnology revolution, and more recently the big data revolution. Traditional skill-based agriculture is rapidly transforming into digital and data-driven agriculture with big data playing a critical role in enhancing productivity. To extract useful information from the generated data requires a new generation of practices or tools known as “Big Data Analytics.” Data analytics is aimed at deriving knowledge and wisdom from data. Digital information on soil, weather, climate, crop, etc., is fundamental to digital agriculture and predictive data analytics [3].

As the information technology spreads fast, most of the data was born digital, as well as exchanged on the internet today. According to the estimation of Lyman and Varian, the new data stored in digital media devices was already more than 92 % in 2002, while the size of these new data was also more than five exabytes. In fact, the problems of analysing large scale data did not suddenly occur but have been there for several years because the creation of data is usually much easier than finding useful things from the data. Even though computer systems today are much faster than those in the 1930s, the large-scale data is a strain to analyse even today.

In response to the problems of analysing large-scale data, quite a few efficient methods [4], such as sampling, data condensation, density-based approaches, grid-based approaches, divide and conquer, incremental learning, and distributed computing, have been presented. Of course, these methods are constantly used to improve the performance of the operators of the data analytics process. The results of these methods illustrate that with the efficient methods at hand, we may be able to analyse the large-scale data in a reasonable time.

This paper presents the role of big data in agriculture and also how big data analytics can work on determinant factors of agricultural productivity.

## **2.Literature review**

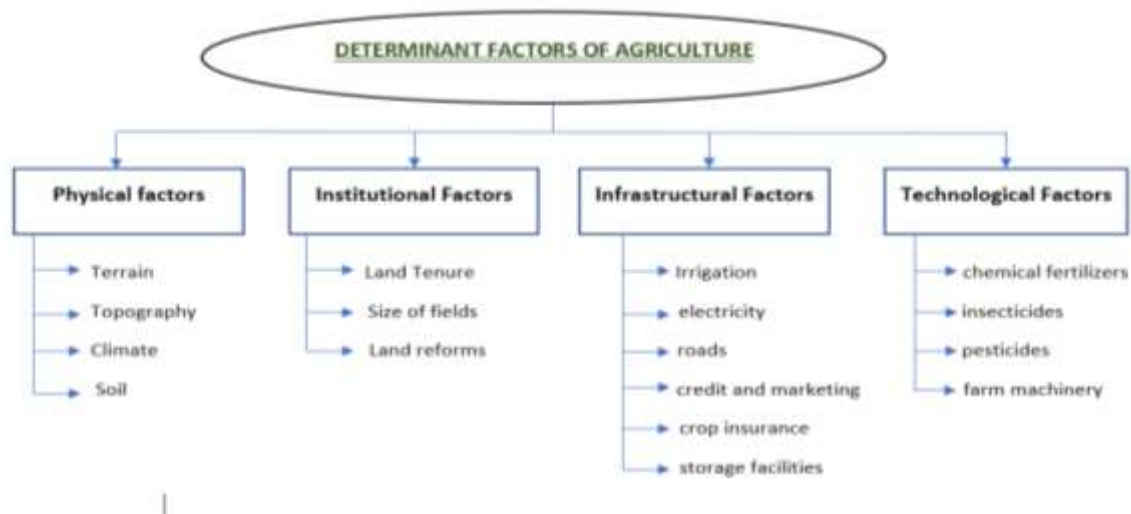
Andreas and et al [5] in their review paper on practice of big data analysis in agriculture had presented how big data can facilitate farmers and the farming companies to increase their productivity. Keith and et al [6] in their paper on Big Data in Agriculture discuss the opportunities and challenges of big data in agriculture and conclude how big data technologies help in every stage of farming. In another paper by Kelly Bronson and et al [7] the authors have described how the digital revolution is caused by the application of Big Data in Agriculture very clearly. In this paper authors state the big data analytic methods that critically influence the detrimental factors of agriculture. Sjoukje and et al [8] have discussed in their paper on Big Data in Agriculture assess the conditions required or favourable for adoption of big data in agricultural activities. The authors Madhuri and Indramma [9] in their paper on the role of big data in agriculture have detailed the methods of incorporating big data techniques in agricultural activities. The authors Emma and et al in their paper on Identifying Obstacles in Agriculture had discussed the ambiguity in realising the ROI in application of Big Data Analytics in Farming [10].

## **3.Determinant factors of agricultural Productivity**

The agricultural practices, cropping patterns and their productivity are closely determined by the geo-climatic, socioeconomic, and cultural-political factors and also infrastructural



and technological factors [11]. The determinant factors of agriculture are shown in Figure 3.1



**Figure 3.1 Determinant Factors of Agriculture**

### 3.1 Physical factors

The physical factors have varying influences on the agricultural productivity of a region. For example, while paddy cultivation requires levelled fields in order to have standing water, the tea plantations perform well in the undulating topography in which water does not remain standing. The highly rarefied air, low pressure, low temperature, and shortage of oxygen at high altitudes are serious impediments not only in the cultivation of crops but also in keeping dairy cattle.

Topography affects agriculture as it relates to soil erosion, difficulty of tillage and poor transportation facilities. On rough, hilly lands, the use of agricultural machinery is impossible.[12], The amount of rainfall received in a region determines the selection of crops to be sown like we can grow jute in West Bengal but not in Rajasthan due to the variation in rainfall. The gullied land is the least conducive for cropping and are highly eroded and are deficient in key nutrient resources required for agriculture.

The influence of temperature, humidity, and sunlight together is best understood using Potential Evapotranspiration (PET) calculations. PET is calculated using the Thornthwaite equation,

$$PET=16(L/12)(N/30)(10Td/I) \quad (3.1)$$

where, PET= Potential Evapotranspiration (mm/month)

Td = average daily temperature of the month is calculated

N= Number of days in a month is calculated.

L = Average day length of the month is calculated.

I= Heat index which depends on the 12 monthly mean temperatures Tmi[13].

### 3.2 Institutional factors

Land values are determined by demand and supply. Factors that shift the demand for and supply of agricultural land relate to competing uses for land, changes in agricultural productivity, speculative forces, the potential of land to hedge against inflation and its amenity values. In this paper we discuss the main institutional factors affecting the rental and sales markets for agricultural land.

### 3.2.1 Land Holdings

The average size of landholding has been continuously decreasing on account of an increasing number of landholders. From an average of 2.28 hectares in 1970-71, it went down to 1.15 hectares in 2010-11.

“Such tiny holdings by the large majority of the farmers are neither viable nor sustainable for a country with billion-plus mouths to feed and the continuous decline in the average size of land holdings also creates a serious problem.

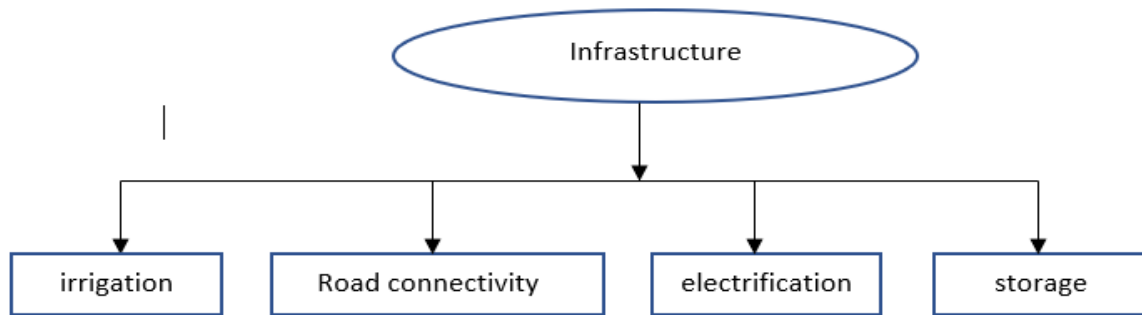
### 3.2.2 Agricultural Credit

Credit is one of the vital prerequisites of the farmers, which facilitate them to meet the investment as well as working capital requirements.

Despite a large network of Rural Financial Institutions (RFIs), a large portion of the rural population is continuously neglected by the formal banking sector in India.[14]

### 3.3 Infrastructural Factors

Infrastructure implies those facilities that help farmers in the processes of sowing to selling and it is shown in Figure 3.2.



**Figure 3.2 Infrastructure Factors**

The process of supplying water to crops by artificial means such as canal, wells, tube wells, tanks etc. from the source of water such as resources, tanks, ponds or underground water is called irrigation. Infrastructure Increases Agricultural Production and Productivity, Reduces Cost of Production, Improves Social Benefits, increases the Welfare of Producer and Consumer.

### 3.4 Technological Factors

Technology in agriculture affects many areas of agriculture, such as fertilisers, pesticides, seed technology, etc. New-age technologies focus on robotics, precision agriculture, artificial intelligence, block chain technology, and more [15]. Some technological advancements that have innovated agriculture:

Improved productivity from mechanisation of agriculture, Climate/ weather prediction through artificial intelligence, Resilient crops developed via use of biotechnology, Agriculture Sensors, improving farm yields and supply chain management using Big Data.

#### 3.4.1 Multi linear regression to forecast the crop yield

For a given dataset where  $x_1 \dots x_k$  are independent variable, the multiple linear regression fits the dataset to the model: is given by the equation 3.2

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 x_{2i} + \dots + \beta_k x_{ki} + \epsilon_i, \quad (3.2)$$

where  $\beta_0$  is the y-intercept and  $\beta_1, \beta_2, \dots, \beta_k$  parameters are called the partial coefficients [16].

#### **4. Big Data and Machine Learning**

Machine learning is an important area of artificial intelligence. The objective of machine learning is to discover knowledge and make intelligent decisions. Machine learning algorithms can be categorised into supervised, unsupervised, and semi-supervised. When big data is concerned, it is necessary to scale up machine learning algorithms. [17] Another categorization of machine learning according to the output of a machine learning system includes classification, regression, clustering, and density estimation, etc. Machine learning approaches include decision tree learning, association rule learning, artificial neural networks, support vector machines (SVM), clustering, Bayesian networks, and genetic algorithms, etc.

Naive Bayes algorithm can be used for evaluating and understanding a classification technique. It can calculate explicit probabilities combining with the observed data.

$$P(X/D) = (P(D/X)P(X))/P(D)P(X) \quad (3.3)$$

In the equation 3.3, D is the training data, X is the hypothesis and P is defined as the probability.

Once the data is obtained and preprocessed the attributes that are chosen as parameters are place, area, yield, soil type and rainfall. Following which the model is trained and the obtained output is visualized with the help of any visual analytics tool such as tableau for decision making and crop selection [18].

#### **4.1 Advanced learning methods**

Students identified as in need of advanced learning services have an exceptional ability to learn or reason beyond their same-age peers. Their minds are often ahead of their physical growth, and specific cognitive and social-emotional functions can develop unevenly. These children exhibit a high ability to make meaning out of complex concepts or problems.

##### **4.1.1 Representation Learning**

Datasets with high-dimensional features have become increasingly common nowadays, which challenge the current learning algorithms to extract and organize the discriminative information from the data. Fortunately, representation learning [19], a promising solution to learn the meaningful and useful representations of the data that make it easier to extract useful information when building classifiers or other predictors, has been presented and achieved impressive performance on many dimensionalities' reduction tasks [20]. Representation learning aims to achieve that a reasonably sized learned representation can capture a huge number of possible input configurations, which can greatly facilitate improvements in both computational efficiency and statistical efficiency [21]. There are mainly three subtopics of representation learning: feature selection, feature extraction, and distance metric learning. [22] have been proposed in recent years. The rapid increase in the scientific activity on representation learning has been accompanied and nourished by a remarkable string of empirical successes in real-world applications, such as speech recognition, natural language processing, and intelligent vehicle systems [23].

##### **4.1.2 Distributed and parallel learning:**

There is often exciting information hidden in the unprecedented volumes of data. Learning from these massive data is expected to bring significant science and engineering advances which can facilitate the development of more intelligent systems. In this context, distributed learning seems to be promising research since allocating the learning process among several workstations is a natural way of scaling up learning algorithms [24]. In the past years, several popular distributed machine learning algorithms have been proposed,

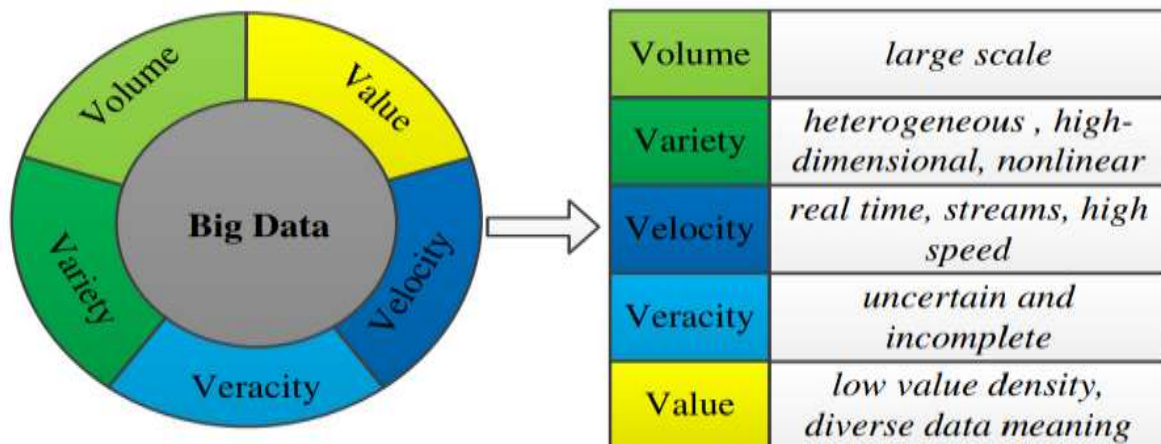
including decision rules, stacked generalization, meta-learning, and distributed boosting [25]. With the advantage of distributed computing for managing big volumes of data, distributed learning avoids the necessity of gathering data into a single workstation for central processing, saving time and energy. It is expected that more widespread applications of distributed learning are on the way. Similar to distributed learning, another popular learning technique for scaling up traditional learning algorithms is parallel machine learning[26]. With the power of multicore processors and cloud computing platforms, parallel and distributed computing systems have recently become widely accessible. A more detailed description about distributed and parallel learning can be found in [27].

### 4.1.3 Transfer learning

A major assumption in many traditional machine learning algorithms is that the training and test data are drawn from the same feature space and have the same distribution. To tackle this issue, transfer learning has been proposed to allow the domains, tasks, and distributions to be different, which can extract knowledge from one or more source tasks and apply the knowledge to a target task [28]. The advantage of transfer learning is that it can intelligently apply knowledge learned previously to solve new problems faster. Based on different situations between the source and target domains and tasks, transfer learning is categorized into three sub settings: inductive transfer learning, transudative transfer learning, and unsupervised transfer learning. In terms of inductive transfer learning, the source and target tasks are different, no matter when the source and target domains are the same or not. Transudative transfer learning, in contrast, the target domain is different from the source domain, while the source and target tasks are the same. Finally, in the unsupervised transfer learning setting, the target task is different from but related to the source task [29]. Recently, transfer learning techniques have been applied successfully in many real-world data processing applications.

Big data refers to the large, diverse sets of information that grow at ever-increasing rates. It encompasses the volume of information, the velocity or speed at which it is created and collected, and the variety or scope of the data points. Big data often comes from data mining and arrives in multiple formats.

It is a great quantity of diverse information that arrives in increasing volumes and with ever-higher velocity. It can also be collected from publicly shared comments on social networks and websites, voluntarily gathered from personal electronics and apps, through questionnaires, product purchases, and electronic check-ins and it is most often stored in computer databases and is analysed using software specifically designed to handle large, complex data sets. Figure 4.1 shows the nature of Big Data.



## Figure 4.1 Nature of Big Data

### 5. Big Data Analytics in Agriculture and Farming

Big data analytics is used to process large amounts of data generated every day across industries and turn them into interpretable insights. According to Information Age, data analytics increased from 17% in 2015 to 59% in 2018. This reflects how more industries are taking advantage of the power of big data analytics. For many businesses, big data analytics is the key to creating more services that lead to a more targeted customer experience and ultimately more profit.

This technology has pioneered many digital transformations across the globe, such as eCommerce, transportation, and healthcare. And agriculture and farming are no exception. Examples such as AI, machine learning, and the Internet of Things [30].

Some of the ways are: -

- Building stronger seeds
- Predicting and identifying diseases
- Predicting and responding to changes in weather patterns
- More accurate crop forecasting and yields
- Optimizing crop prices
- Long-term analysis for better operations

### 6. Application of Data Mining Techniques that can identify Determinant Factors for Crop Productivity

Data Mining (DM) is the process of analysing data from different perspectives and summarizing it into useful information. There are different DM algorithms exist, including the predictive Data Mining algorithms, which result in classifiers that can be used for prediction and classification, and descriptive data mining algorithm that serve other purposes like finding of associations and clusters.[31] Since data mining is the most important tool to discovery knowledge from a large database. It is a process of semi automatically analysing large databases to find valid, novel, useful and understandable patterns. In addition, Data mining has paid attention to modelling as much as pre-processing and cleaning data to gain best results.

#### 6.1 CropSyst (Cropping system simulation Model)

CropSyst is one of the most important process-oriented simulation models at present. It is a multi-year, multi-crop, daily time step crop growth simulation model, developed with emphasis on a friendly user interface, and with a link to GIS software and a weather generator (Stockle et al. 1994). The model was largely used for many crops all over the world, such as maize, wheat etc.

The CropSyst objective is to serve as an analytical tool to study the effect of cropping systems management on crop productivity and the environment. For this purpose, CropSyst simulates the soil water budget, soil-plant nitrogen budget, crop phenology, crop canopy and root growth, biomass production, crop yield, residue production and decomposition, soil erosion by water, and pesticide fate. These are affected by weather, soil and crop characteristics, and cropping system management options including crop rotation, variety selection, irrigation, nitrogen fertilization, pesticide applications, soil and irrigation water salinity, tillage operations, and residue management. Expressive information on the effect of irrigation rescheduling on barley productivity could be very useful in determining yield losses for economical purposes. Thus, using simulation models to attain that could be the ultimate solution. [32] Stability of grain yield

performance is an important characteristic under adverse growth conditions, such as water stress or heat stress. Two parameters were used to test that stability.[33]

## **6.2. DSSAT (Decision Support System for Agrotechnology transfer)**

The DSSAT is a collection of independent programs that operate together; crop simulation models are at its centre. Databases Describe weather, soil, experiment conditions and measurements, and genotype information for applying the models to different situations. Software Helps users prepare these databases and compare simulated results with observations to give them confidence in the models or to determine if modifications are needed to improve accuracy. DSSAT was first released in 1989 and additional releases were made.

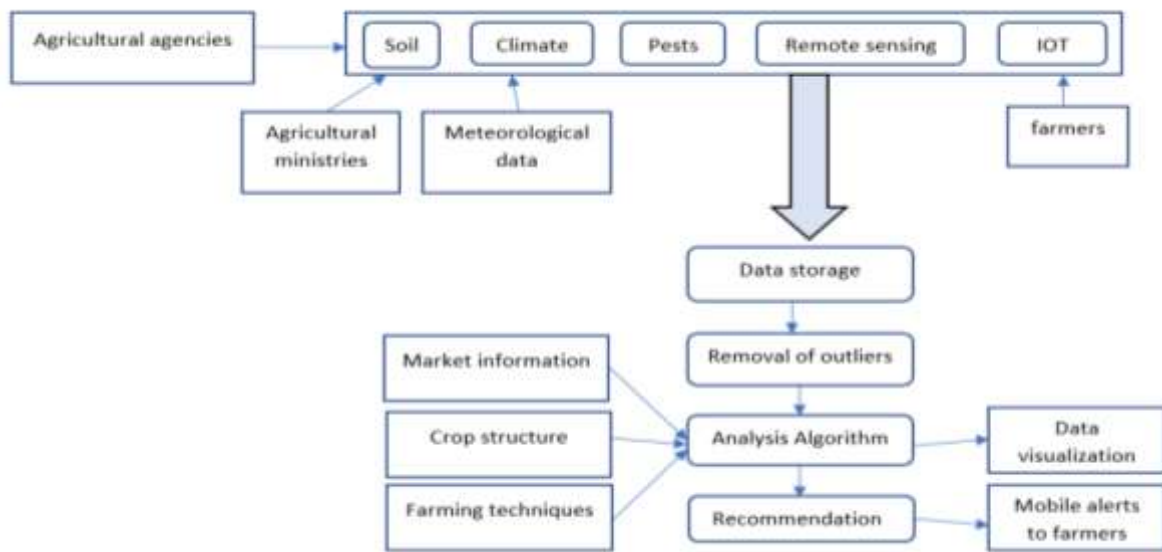
The aims of DSSAT is to simulate monocrop production systems considering weather, genetics, soil water, soil carbon and nitrogen, and management in single or multiple seasons and in crop rotations at any location where minimum inputs are provided, to provide a platform for easily incorporating modules for other abiotic and biotic factors, such as soil phosphorus and plant diseases, to provide a platform that allows one to easily compare alternative modules for specific components to facilitate model improvement, evolution, and documentation, and to provide a capability for easily introducing the CSM into additional application programs in a modular, well documented way. [34]

The DSSAT is structured using the modular approach. The Most important features of our approach are that it separates modules along disciplinary lines and enables individual components to be plugged in or unplugged with little impact on the main program or other modules that are for the comparison of different models or model components. It allows for easy integration into different types of application packages due to the well-defined and documented interface to the modules.[35]. Many of these applications have been done to study management options at study sites, including fertilizer, irrigation, pest management, and site-specific farming.

## **7. Big Data Framework with Factors influencing Agriculture**

Big data is a set of techniques and technologies that require new forms of integration to uncover large hidden values from large datasets that are diverse, complex, and of a massive scale. The amount of data generated as Big Data ranges from Terabytes to Exabytes and Zettabytes of data. The Big Data Framework that influences Agriculture is shown in Figure 7,1.

The Big data in agriculture refers to the Electronic Farm Records (EFR) which incorporates soil temperatures maps and information, precipitation maps and information, electrical conductivity maps and information, dampness content information, air penetrability maps the supplement substance and pH level information, past development records, protection and yield related data and online networking posts including tweets, websites, news sustains and articles in agribusiness diary.[36] The occupation of the huge information researcher is to mine the huge information and find the affiliations, comprehend examples and patterns to enhance the horticultural frameworks, build crop profitability and lower costs included by appropriately diagnosing the different variables. Agricultural data has to be cleaned by removing outliers and noisy data. Data analysis is the core component of the architecture as it approximates the agricultural issues.[37]



**Figure 7.1 Big Data Framework in Agriculture**

### 8. State of the art of Big Data applications in Smart Farming and Key Issues

The Table 8.1 summarises the state-of-the-art features of Big Data applications in Smart Farming and the key issues corresponding to each stage of the Big Data chain that were found in literature [38].

**Table 8.1 Big Data Applications in Smart Farming**

Stages of the Data Chain	State of the Art	Key Issues
Data capture	Sensors, Open data, data captured by UAVs. Reciprocal data	Availability, quality, formats
Data transformation	Machine learning algorithms, normalize, visualize	Heterogeneity of data sources, automation of data cleansing and preparation
Data transfer	Wireless, linked open data, Cloud-based platform	Safety, agreements on responsibilities and liabilities
Data storage	Cloud-based platform, hybrid storage systems, Hadoop distributed file system	Quick and safe access to data, costs
Data marketing	Data visualization	Ownership, privacy, new business models

Data analytics	Planting instructions, benchmarking, Yield models	Semantic heterogeneity, real-time analytics, scalability
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## Conclusion

The reason for assessing the factors influencing farmers' productivity is to properly inform the farming populace of the study area of the factors that impact on their output, which if considered will improve and sustain farm scale and productivity, to ensure food security. These could be achieved through access to more credit, increase in farm size, membership of the number of years in school and membership of farm-based organisation, through which the farmers gain exposures from outreach programmes and spat plots among other information that help to improve their productivity. Big data is a promising platform for storing heterogeneous data. Applying predictive models enables analysing and managing the data which could be a giant step towards developing an effective decision support system in the farming sector. Availability of data from different factors considered will contribute to identifying the yield gap in agriculture. Yield gap is the measure of the difference between yield potential of the field and the average yield of the same area. Applying big data analytics aims at reducing the yield gap. This paper focused on the review on use of big data in the agricultural sector. The important factors affecting the crop yield are identified and summarized. The accessibility of open big data analysis tools encourages the research towards smart farming and the key issues. The Application of Data Mining Techniques that can identify Determinant Factors for Crop Productivity In agriculture is also summarised with two techniques which need to increase food production and security by enabling the farmers to adopt best practices in agriculture with the suitable recommendations that are environmentally beneficial.

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# Design of Single Acceptance Sampling plan under Truncated Poisson Distribution

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## ***Abstract***

*In this paper a new probability Poisson distribution is studied to design an attribute acceptance sampling plans for a lot sentencing, with the fraction of non-conforming items being modelled by a Truncated Poisson distribution. This paper further elaborates the need of truncation in production environment and reduce the risks for producer and consumer. The probability of acceptance value are given for the various combinations of controlled points of the operating curve (OC) with respect to sample size and acceptance number. The design was carried out for single sampling plan, which includes several combinations of quality levels required by the producer and the consumer. The real time applications for the proposed sampling plan was elaborated with suitable tables and illustrations.*

**Key Words:** Single Sampling plan, Acceptance Sampling Plan, Truncated Poisson.

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# An Attempt to Analyze the Impact of current ongoing Pandemic on Indian Healthcare System and Its Ramifications on the Country's Economy

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## 1. Abstract

*The ongoing pandemic at the present time is one of the greatest disasters in the history of human civilization and it has caused havoc across the globe. India is one of the worst countries affected by this pandemic. Indian economy suffered heavily and the healthcare sector is the worst affected. The pandemic has opened our eyes to the extent that both the central and state governments are investing heavily in the healthcare sector and diverting capital, workforce and technological resources into this sector but only governmental efforts are not enough. Academicians, researchers and industry professionals should team up together to analyze the effects of this pandemic on Indian healthcare system and to find out its impact on national economy and therefore a suitable framework must be developed to enhance national economy and Indian healthcare system after the pandemic. The aim of this paper is to analyze the various factors affecting the nation's healthcare system during the current pandemic and to analyze its probable short-term and long-term ramifications on the country's economy and seek various measures to combat the pandemic. This paper also analyzes the live data collected from various government websites to address the aforesaid issues.*

**Keywords:** Economic impact, Health economics, Indian healthcare system, GDP

## 2. Introduction

The generally asymptomatic disease with an incubation period between two days to two weeks, if symptomatic, shows symptoms including fever, weakness, restlessness shortness of breath, dry cough, throat irritation, loss of taste or smell and leads to pneumonia and acute respiratory distress syndrome in severe cases, which can cause multiple organ failure and subsequently death. Elderly people, children and people with co-morbidities are most vulnerable. Home isolation or quarantine, personal hygiene measures, face masks, vaccination and social distancing are the main safeguards against Coronavirus.

Globally there have been 176,693,988 cases and 3,830,304 deaths, as of 2021 (as reported by WHO). Economically, this has inconvenienced companies globally by disrupting the

operations of supply chains, causing recession and loss of jobs. Consumers changed their consumption patterns and subsequent hoarding led to the shortage of essential goods. Irregular instability and shortage of goods occurred in various sectors; requiring unconventional investment in the sectors affected the worst.

The present pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) heavily impacted the world owing to its high transmissibility. The virus is believed to be of zoonotic origin (bats or a related mammal), with the first reported case originating in Wuhan, China in December 2019. Droplet transmission owed to its easy spread across borders, causing millions of infection cases and deaths, which led to WHO Director-General declaring it to be a Public Health Emergency of International Concern (PHEIC) on 30<sup>th</sup> January, 2020 before subsequently characterizing it as a pandemic on 11<sup>th</sup> March, 2020.

India's significant international connectivity in terms of import and export, defense, workforce and manufacturing led to the economic sector being heavily affected. The high adversity faced by the healthcare sector and the high population of 1.35 billion, could result in almost one sixth of the world population being affected, thereby making it imperative to study the trends and forecasts in order to strategize control measures.

### **3. Literature Survey**

The literature surveys for this paper has been conducted in both content specific as well as in chronological manner and the main contributions of the researchers and academicians has been categorized into related sub headings and have been presented in the summarized form.

Understanding the Indian Healthcare System.

In India, state governments, instead of the centre, have the power of making health-related decisions and strengthening public health measures, through both public and private institutions, with the public segment tending to the primary needs, while the private institutes in big cities providing the majority of the services which are secondary, tertiary and quaternary in nature.

In comparison with other countries Indian healthcare sector has the advantages of having a larger skilled workforce and cheaper procedures. One of the largest segments of the economy corresponding to stakeholders, beneficiaries and job creation, it has seen rapid growth through increased coverage and involvement of both public and private entities, in terms of telemedicine, mobile health, online services and product delivery and digital marketing. Usage of unique identification numbers, biometrics and storage clouds, as well as advanced data storage and protection has boosted the public healthcare sector.

India, however, holds the 145<sup>th</sup> rank amongst 195 countries in terms of quality and ease of access of healthcare. The availability of beds in India ranges from 0.5 beds per 1000 patients overall, with the average ranging from 0.2 in some areas to 4.5 in others for every 1000 patients. The availability of ICU beds and ventilators are approximated to be 70000 and 40000 respectively. With cost pressures presenting a serious challenge, the private sector tries to increase efficiency by providing specialized care and utilizing advanced technology and diagnostic systems. [1]

#### **Pandemic onset in India.**

The first positive Coronavirus case was reported in India on 30<sup>th</sup> January, 2020. In 41 days, the number increased to 50 cases, crossing 300 cases within three weeks and kept

rising by at least 50 cases per day. Almost 75% of the country was affected including the 28 states and 9 Union Territories, with Maharashtra and Kerala being the worst-affected. Despite a “Janata curfew” on 22<sup>nd</sup> March, 2020 showing a decline of cases for a single day, 536 people were found to be COVID positive and 10 deaths occurred (case fatality of ~1.9%) till 20<sup>th</sup> March, 2020. After a country-wide lockdown starting on 25<sup>th</sup> March, 2020 to 31<sup>st</sup> May, 2020, the number of confirmed cases stood at 182,143 with 5,164 fatalities. [2], [3].

#### Impact of Pandemic and cost to the healthcare system.

To the already strained Indian economy with a rate of growth of Gross Domestic Product (GDP) for the fiscal year of 2019-20 at 4.2%, which was lower than the previous years, the pandemic caused an unforeseen challenge. The Pandemic’s severity and the countrywide lockdown disrupted demand and supply chains and had long- lasting impacts on the already ailing GDP and healthcare sector.

Severe challenges were faced in handling the accelerating case load owing to the vast population, unequal distribution of resources and weak healthcare system. The system where 2% of the total 3.6% of GDP’s investment came from individuals (65% of total expenditure), with the Government contributing 1.5% of the 3.6%, was therefore not prepared to tackle the pandemic.

The disruption in free cash flow and revenue generation across hospitals, as reported by the FE Bureau in 2020, manifested itself by affecting the out-patient division (OPD) department during lockdown and the general populace showing reservations about turning to hospitals for preventative measures. The in-patient division (IPD) bore the effects of the government’s postponement of elective surgeries and non-essential supplies. With international travel contributing heavily to the pandemic, medical tourism was adversely affected owing to no/slow tourist influx.

The margin profiles would be impacted owing to the non-deferrable nature of salaries of doctors and employees and consultation charges borne by hospitals (50-60% of overall cost) being supplemented by increasing necessity and costs of medicines, sanitizers and other pharmaceuticals. [3], [4].

#### Health care funding and fiscal implications.

As the health systems got overstretched and reduced in efficiency, through the introduction of financial packages, the Government had to procure more test kits and labs to meet the shortages in medical supplies and testing. Cash and in-kind transfer to low-income households, insurance for healthcare professionals and financial assistance for low wage workers and job-seekers were provided as part of a stimulus package on 26<sup>th</sup> March, 2020, at 0.8% of the GDP.

To address the shortage of testing centers and beds in quarantine facilities (111 and approx. 60000 respectively), 15,000 crore rupees was announced as ‘India COVID-19 emergency response and health system preparedness package’. Rs. 7774 crores went towards Emergency response and the rest towards medium-term support of 1-4 years. Containment and control were the primary response strategies of the Ministry of Health and Family Welfare (MoHFW). According to a report by PIB Delhi, 223 labs (66 private and 157 Government) were conducting meticulous screening as of 9<sup>th</sup> April, 2020, with the states and Union Territories receiving disbursement worth Rs. 4113 crores in total.

Even by conservative estimates not considering additional expenses to the Government caused by the pandemic since 2019, the deficit predicted by fiscal policies, is higher than 2021 budget’s projected value. To maintain budgetary expenditure of fiscal year 2021 at

the budgeted level, a high fiscal slippage from GDP's 3.5%, as budgeted, has to be allowed by the Centre, which would incur a fiscal deficit of at least 5%, as a result of the sluggishness in the taxes received due to diminished economic growth.[4],[5]. Allocation of resources to the Indian healthcare system to combat the pandemic

Emergency measures addressed in the 15000-crore budget included boosting the number of personal protective equipment (PPE) and testing facilities, dedicated treatment facilities, centrally procuring drugs and essential medical equipment and training workers in the medical and paramedical sector. Prevention and response in case of future outbreak of diseases by improving existing healthcare systems and building new systems through the development of laboratories and surveillance systems were included in the long-term measures. Also included were reinforcing pandemic research and multi-sector platforms and national organizations, risk conveyance and community involvement, monitoring and evaluation, capacity building and bio-security readiness.

These measures would be implemented by the MoFHW, which oversees the national institutions likes Central Procurement, National Health Mission, Railways, Department of Health Research/ICMR and National Center for Disease Control. To overcome the weak infrastructure of the healthcare sector, private institutions provided essential support and the tourism and railway infrastructures were included to meet the demand for quarantine zones.

To meet the challenge faced by health insurance business, state governments were to provide COVID testing expenses, while the existing insurance policies were to extend their coverage for positive cases. An advisory was issued by the Insurance Regulatory and Development Authority of India (IRDAI) towards the speed-up the processing where claims pertaining to the pandemic were made. Ayushman Bharat PradhanMantri Jan ArogyaYojana covered Coronavirus positive individuals living below poverty line.

People with existing health insurance schemes were entitled to coverage for costs arising from COVID-19 treatment, but, as of 2018, 500 million people in India did not have health coverage.

A rise of 30% was seen in the purchase of online Health Insurance schemes, while a fallout was noticed in offline schemes. Policies exclusively covering ambulance charges, treatment charges and pre- and post-hospitalization charges were introduced by several insurance companies. These policies offered coverage for a year and did not include coverage for cases developing during the activation processing period. The resultant increase in patients seeking treatment under such schemes in comparison with the cash patients would increase the hospitals' debtor days, leading to reduced net working capital. [5], [6], [7].

### Equity Impacts of Pandemic

In low- and middle-income countries like India, health system depends heavily on out-of-pocket (OOP) expenditure as the Government's expenditure on healthcare is low. Low investments in preventive public health infrastructure and higher investment in big hospitals or tertiary care may be attributed to Indian elites. Continued low investment in public health infrastructure, lack of professionals, thereby increasing the financial burden of healthcare renders it difficult for the Government to meet the healthcare necessities of the people. Owing to the high cost of healthcare in private institutions, it is often unaffordable by low-income households and places a heavy financial burden, and has become one of the most significant factors in pushing people into poverty in the country. Elderly and frail people, as well as those with multiple chronic diseases are under highest risk from COVID related complications. Another vulnerable group is the stranded, poor,

daily wage earners, noticeable recently as the migrant workers, who live barely above the poverty line and get pushed back below the poverty line due to the heavy cost of healthcare. The wealth inequality is worsened from the heavy reliance on out-of-pocket expenditure, creating economic barriers for the less affluent in accessing healthcare, which causes impoverishment. Around 100 million people face impoverishment each year according to estimates, while 150 million experience extreme economic shortages, arising from individual health expenses and over 90% of this demographic reside in the low-income countries. Such excessive spending in the form of individual spending on healthcare raises its cost on the nation, simultaneously impoverishing many people in developing and low-income countries, especially India. [8],[9],[10].

#### **4. Research Objective**

- To deeply analyze the covid19 dataset, vaccination rate, effect of it on Indian economy in terms of GDP and ultimately to link together all these factors to find the trends in recent future
- Moreover this paper attempts to analyze the different economic effects of the pandemic on the nation's healthcare based on efficiency and equity, and combat them by suggesting regulative measures.

#### **5. Research Methodology**

Nature of data and its collection

As the nature of data is completely secondary, we collected it from multiple sources like

- Ministry of Health and Family Welfare, Government of India's website. [<https://www.cowin.gov.in/home> as a reference up to May 2021]
- Websites of International Monetary Fund, World Health Organization and World Bank.

Data analysis

As a primary step, India's pre-COVID scenario was studied, which was followed by tracking the confirmed case numbers and deaths, as well as Corona positive cases' average pattern of affecting the country. This was followed by the sorting of data from the aforementioned sources, highlighting the impacts on the economy and combative measures, whose effects, when perceived, were documented as well. The pandemic's immediate impact on the healthcare sector was noted and the possible long-term ramifications were outlined.

The increase in the spread of the corona virus has increased declaring the disease as an epidemic.

Thus, samples for testing Corona positive have also increased. With symptoms like cough, fever it is a necessity for all humans to undergo a covid test.

The graphical representation of the state wise total covid samples collected (Figure 1) and the month wise covid samples collected (Figure 2), till date:



Andaman and Nicobar Islands	48421141
Andhra Pradesh	2317328178
Arunachal Pradesh	93898832
Assam	1503246072
Bihar	4259541099
Chandigarh	47738021
Chhattisgarh	906227297
Dadra and Nagar Haveli and Daman and	6324267
Delhi	2293549529
Goa	110913191
Gujarat	2404426020
Haryana	1122331298
Himachal Pradesh	205873117
Jammu and Kashmir	1022344686
Jharkhand	1124231599
Karnataka	3577891460
Kerala	2108048523
Ladakh	10457719
Lakshadweep	4011881
Madhya Pradesh	1180300730
Maharashtra	2494829095
Manipur	102227461
Meghalaya	60925436
Mizoram	43166524
Nagaland	30645502
Odisha	1678149372
Puducherry	119428976
Punjab	1023843442
Rajasthan	1415485843
Sikkim	15014456
Tamil Nadu	3683392789
Telangana	1699372735
Tripura	131753777
Uttar Pradesh	6042367023
Uttarakhand	466266210
West Bengal	1733046540

Figure 5

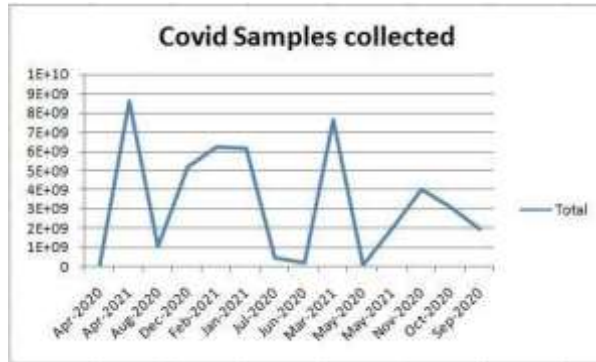


Figure 6

The state wise total covid positive and negative samples found till date (Figure 3) and the average of confirmed cases per month (Figure 4):

Row Labels	Sum of Negative	Sum of Positive
Andaman and Nicobar Islands	1210	1229134
Andhra Pradesh	2238467318	3859260
Arunachal Pradesh	84203735	51245
Assam	2163110	2065991
Bihar	2299	1859345
Chandigarh	42416510	59195
Chhattisgarh	2701459	467857
Dadra and Nagar Haveli and Daman and	6047477	169010
Delhi	443105	6848173
Goa	115631	266181
Gujarat	41432659	8009517
Haryana	712426421	2830183
Himachal Pradesh	192463143	119494
Jammu and Kashmir	992912225	977615
Jharkhand	1094780483	26875714
Karnataka	35609721	4701197
Kerala	3219804	79723175
Ladakh	8559512	89027
Lakshadweep		
Madhya Pradesh	1094648855	1679782
Maharashtra	383680847	96901593
Manipur		101501
Meghalaya	56458876	33904
Mizoram	0	19795
Nagaland	109169	90682
Odisha	64160	2214458
Puducherry	104200990	6287323
Punjab	1386806	960287
Rajasthan	535500271	2445076
Sikkim	438779	17644
Tamil Nadu	32180448	12772604
Telangana	2475974	3855373
Tripura	124262821	6796179
Uttar Pradesh	11016397	2743971
Uttarakhand	44172739	350257
West Bengal	568	3487431

Figure 7

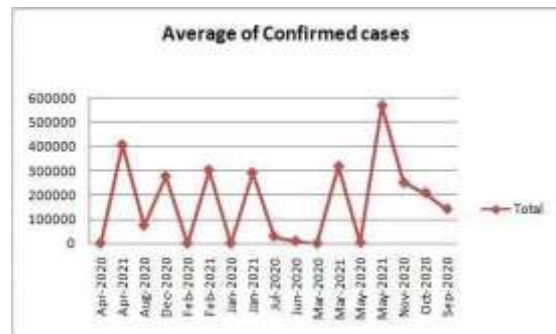


Figure 8

Also, the average number of deaths (Figure 5) and cured (Figure 6) have increased.

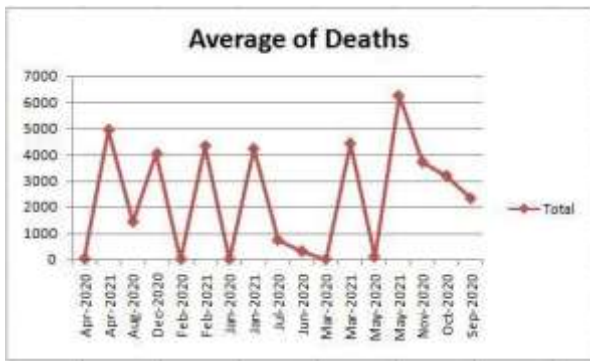


Figure 9

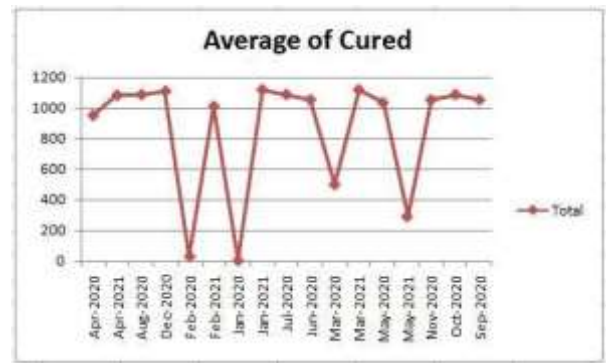


Figure 10

Please, refer the attached excel sheet (Covid 19 cases in India.xlsx) for the statewise report of Covid Cases. In order to fight against Coronavirus two types of vaccines were introduced in India (Figure 7)-

1. Covishield
2. Covaxin

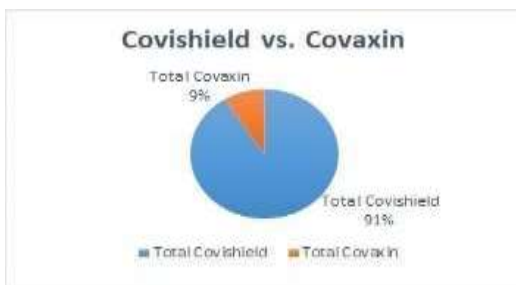


Figure 11

For a detailed report of the given figures, please find the links to the attached sheets in the appendix.

## 6. Result & Discussion

Figure 1 gives a graphical representation of the total samples collected by the respective states. The number of samples collected over the given period was highest in Uttar Pradesh which has one of the highest populations in the country, while it was lowest in Lakshadweep, an union territory with low population.

Figure 2 is a line graph that illustrates the covid sample collection statistics per month, from April 2020 to May 2021. Sample collection was highest in the months of April, 2021 and May, 2021, while the lowest sample collection rates were observed in April, May and July of 2020, which may be attributed to the initial lack of severity of the pandemic's spread in India and the control in the spread of the virus owing to the subsequent nationwide lockdown.

Figure 3 shows the state wise positive and negative samples found. Andhra Pradesh had the highest number of negative samples, while Kerala had the highest number of positive samples.

The line graph in figure 4 shows the variation in the average number of confirmed cases over the period of April, 2020 to May, 2021. The average of confirmed cases rose slowly from March, 2020 to July, 2020, with the highest average being recorded in May, 2021.

Figures 5 and 6 show the average of deaths from Coronavirus and the average of cured cases, over the months of March, 2020 to May, 2021. A sharp spike in highest average of deaths is noticed in May, 2021, which also had the lowest average of cured cases. This may be attributed to the increased severity of the newly discovered Delta variant.

Figure 7 is a pie chart representing the respective percentages of vaccinated people who had received either Covishield or Covaxin, since the administration of dosage started in India. Covishield, made by the Serum Institute of India, under license from AstraZeneca has the higher rate of production per month (nearly 100 million per month in May, 2021) and therefore accounts for approximately 91% of the administered vaccination doses in the country. Bharat Biotech's Covaxin, on the other hand, with approximately 10 million doses manufactured in May, 2021, had nearly 1/10th the production of Covishield, which is reflected in the 9% of doses administered being Covaxin.

## 7. Conclusion

The pandemic's sudden occurrence, rendered countries incapable of making detailed plans to handle the pandemic. The study analyzed the effect of the pandemic in India, especially with respect to healthcare, the biggest impacted sector. The nation's economic flows were further affected by strict lockdown measures, taken in order to curb the spread.

Various steps were taken by the Indian Government with the objective of allocating funds, manpower and various resources, such as increasing corona tests and quarantine centers, investing on medical treatment and more. Attempts were made at addressing the wealth disparity through relief packages for various marginalized groups, extending benefits of the Ayushman Bharat PradhanMantri Jan ArogyaYojana, issuing new directives for the insurance companies already in existence and setting up new insurance schemes. Further study is required in the addressing the condition of poor, stranded, daily workers. Apart from the production of masks and hand sanitizers, the country's research centers also need to increase efforts in the production of vaccines, Ayurveda substitutes and preventive medicines and kits. This paper attempts to synchronize the economy and GDP of India in last one year and its impact on health care sector by analyzing the Coronavirus Pandemic national dataset as a co-related parameter. Though, the diversify sectors are not fully inter-dependent but the association among them we are attempting to address through our

article.

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## Appendix:

1. The detailed analysis of the state wise total covid positive and negative samples found till date. Available from the attached excel sheet -StatewiseTestingDetails.xlsx.
2. [https://drive.google.com/file/d/13hsYs5r1\\_rGz2wseKrjzdbMKmVUwsWzC/view?usp=sharing](https://drive.google.com/file/d/13hsYs5r1_rGz2wseKrjzdbMKmVUwsWzC/view?usp=sharing)
3. The state wise report of Covid cases. Available from the attached excel sheet - Covid 19 cases in India.xlsx.

4. [https://drive.google.com/file/d/17uMyWSrrofBlfGPm\\_9P3G\\_eyV6\\_tKeEi/view?usp=sharing](https://drive.google.com/file/d/17uMyWSrrofBlfGPm_9P3G_eyV6_tKeEi/view?usp=sharing)
5. A detailed report of vaccination. Available from the attached sheet -covid\_vaccine\_statewise.xlsx.
6. <https://drive.google.com/file/d/1TMSNqAkq5yY7wCeR1n4TSWQmE6eWAjdB/view?usp=sharing>

# Statistical Techniques to Improve Software Engineering Effort Estimation Data Quality in U.S. Federal Acquisition Processes

Dr. Tomeka S. Williams

## **Abstract**

*Since the topic of improving data quality has not been addressed for the U.S. defense cost estimating discipline beyond changes in public policy, the goal of the study was to close this gap and provide empirical evidence that supports expanding options to improve software cost estimation data matrices for U.S. defense cost estimators. The purpose of this quantitative study was to test and measure the level of predictive accuracy of missing data theory techniques that were referenced as traditional approaches in the literature, compare each theories' results to a complete data matrix used in support of the U.S. defense cost estimation discipline, and determine which theories rendered incomplete and missing data sets in a single data matrix most reliable and complete under eight missing value percentages. A quantitative pre-experimental research design, a one group pretest-posttest no control group design, empirically tested and measured the predictive accuracy of traditional missing data theory techniques typically used in non-cost estimating disciplines. The results from the pre-experiments on a representative U.S. defense software cost estimation data matrix obtained, a nonproprietary set of historical software effort, size, and schedule numerical data used at Defense Acquisition University revealed that single and multiple imputation techniques were two viable options to improve data quality since calculations fell within 20% of the original data value 16.4% and 18.6%, respectively. This study supports positive social change by investigating how cost estimators, engineering economists, and engineering managers could improve the reliability of their estimate forecasts, provide better estimate predictions, and ultimately reduce taxpayer funds that are spent to fund defense acquisition cost overruns.*

## **Keywords**

Software Cost Estimation, Missing Value, Experimental Design, Engineering Economics, Data Quality, Software Effort Engineering, Software Development, Cost Estimation

## **1 Introduction & Design of the Study**

From the perspective of U.S. public policy statutes and regulations, the U.S. defense cost estimating discipline, and the current Business—Cost Estimating curriculum at Defense Acquisition University (DAU), there is a lack of instruction in which cost estimators, engineering economists, and engineering managers can apply to handle the unreliable and incomplete engineering project data matrix problem they face (DAU, 2018a; GAO, 2009, 2020; International Cost Estimation and Analysis Association [ICEAA], 2019). According to a U.S. defense based Joint Agency Cost Estimating Relationship (CER) Handbook (2018), “data sets with missing and incomplete data” is a data analysis challenge and states that the “best course of action is to first attempt to remedy the problem by collecting more data, finding the information from the collected data set, and determining the cause of the unusual observations, respectively” (p. 221). This government document also acknowledges that it is “not always possible to correct such errors” and that it is important for estimators to understand the implications of these challenges, and to proceed with their analysis under caution (Joint CER Handbook, 2018,

p. 221). The literature does not inform how cost estimators who leverage the defense Business—Cost Estimating curriculum at DAU directly handles the unreliable and incomplete engineering project data matrix problem other than through recognizing the problem through defense government documents and making changes to public policy (GAO, 2020). Because the topic of improving data quality as it relates to data incompleteness has never been addressed for U.S. defense cost estimators and the cost estimating discipline beyond describing the problem or making changes in its public policies, research was needed to fill the gap in the literature to investigate if the use of hands-on-treatment-options could improve software cost estimation of data matrices for this population in the society (10 U.S. Code § 1746, 2012; 10 U.S. Code § 2334, 2017; Morin, 2017). Hands-on-treatment-options could provide the ability to use missing data theory techniques to teach cost estimators ways in which they could directly handle unreliable and incomplete data within the cost estimation discipline. This includes but is not limited to applying missing data theory techniques such as complete case analysis (listwise delete), direct imputation (single or multiple), model-based imputation (full information maximum likelihood), and machine learning methods (García-Laencina et al., 2010).

My research specifically honed-in on the area of software cost estimation because it was the cost estimation topic most commonly found in scholarly peer-reviewed journal articles, conference proceedings, and academic books in respect to this discipline (see Boehm, 1981; Idri et al., 2016b; Jing et al., 2016; Jones, 2007; Strike et al., 2001). Software cost estimation is the process taken to quantify the cost of expected labor effort, lines of code, and calendar time required to develop a software engineering project (Wani et al., 2019).

This gap-mitigating research was needed and can be used to inform ways in which U.S. defense cost estimators could have empirical evidence that supports expanding options for them as individuals to single-handedly address the unreliable and incomplete data problem beyond the sole dependence of public policy changes as referenced in Morin's (2017) and the Department of Defense (DoD) cost analysis data improvement plan. These hands-on-treatment-options will model and simulate the conditions which cost estimators face when they are sitting in front of their computers attempting to create an estimate with imperfect data. Beyond public policy changes, cost estimators could have additional hands-on-treatment-options to use missing data theory techniques within this discipline for the first time. This original research could change how estimators are taught to conduct software cost estimation activities when the unreliable and incomplete data problems create imperfect data sets to use, a real-world data quality issue (see Morin, 2017). A quantitative research design, specifically a one group pretest-posttest no control group/pre-experimental design, measured the level of predictive accuracy of traditional missing data theory techniques treatments applied to 28 data sets from a single group data matrix (Thyer, 2012; see Campbell & Stanley, 1963; Cook & Campbell, 1979; Reichardt, 2019; Shadish et al., 2002). Predictive accuracy is the operational term used to describe how close the error approximation is between the ground truth data sets, the a priori value, as compared to its posteriori value after applying missing data theory technique treatments (Little & Rubin, 2020; Twala et al., 2006).

## 1.1 Problem Statement

There are over 50 federal public policies, statutes, and regulations in place today that apply to the Business—Cost Estimating discipline that is required to produce reliable cost estimates (DAU, 2018b; GAO, 2009, 2020). The general management problem is that despite this, cost estimators do not always have reliable and complete data sets to use when they attempt to forecast life-cycle costs for a myriad of engineering-based acquisition projects and programs and may sometimes forecast costs inaccurately that engineering managers depend on (GAO, 2009, 2020; Jorgensen, 2006; Morin, 2017). Consequently, in 2015, cost estimate growth was reported as cost overruns within DoD's Major Defense Acquisition Programs at \$468 billion, up from \$295 billion in 2008 (Deloitte, 2016). Other studies declared that individual DoD engineering-based acquisition projects and programs experienced cost overruns as high as 40% and were projected to overrun closer to 51% by the year 2020 (Christensen, 1993; Dabkowski & Valerdi, 2016; Deloitte, 2016; Valerdi et al., 2015). These costs overrun statistics support the currency and relevancy that the lack of tools to handle incomplete and faulty data is a current, real-world problem so severe that a DoD cost analysis data improvement effort was started (Morin, 2017). According to Morin (2017), "reliable and comprehensive cost data is essential to produce credible cost estimates as required in both statute and regulation" (p. 1). This supports the U.S. defense cost estimator's need for cost data improvements (Morin, 2017). Multiple credible sources have noted how important it is to have reliable and comprehensive cost data for the multi-discipline of cost estimation which spans the business, engineering economics, software, and systems engineering disciplines (DAU, 2018a; Farr & Faber, 2018; Fraser & Jewkes, 2013; Jorgensen, 2006; Morin, 2017; Newnan et al., 2004; Parnell, 2017).

## 1.2 Purpose of Study

The purpose of this quantitative study was to test and measure the level of predictive accuracy of missing data theory techniques that are referenced as traditional approaches in the literature, compare each theories' results to a complete data matrix used in support of the U.S. defense cost estimation discipline and determine which theories render incomplete and missing data sets in a single data matrix most reliable and complete under several missing value percentages. The three independent variables used for this study were the different percentage levels of missingness created (independent variable 1), the category title of the data set type (independent variable 2), and the traditional missing data theory techniques (independent variable 3). The two dependent variables used for this study were the absolute errors and relative errors calculated from the pre-experimental treatments derived from the data sets' pretest and posttest numerical values. Differences revealed from the absolute error and relative error groups were assessed by ANOVA testing. I used eight different percentages for missing values (diminished completeness) with three treatments on the randomly selected subset of a purposive sample of 30 out of 50 analogous and

synthetic software development programs. Each program was characterized across 28 numerical data sets. Due to the removed-at-random value selection to test and measure at eight different levels

of missingness, each of the data sets had missing data theory treatments applied to fill in incomplete data 56 times, resulting in a total of 4,704 (3\*56\*28) pre-experimental treatments.

Two levels of measurement, absolute error and relative error, were used to measure the predictive accuracy of missing data approaches. Each of the 28 data set types (independent



variable 2) used in this study had data values removed-at-random and at various percentages (independent variable 1) to create a simulation of the missing data problem applied to a representative defense cost estimating data. The removed-at-random-data-values from the data matrix were operationally named the “Original Numerical Value” (pretest value) (Research Randomizer, 2020). The predicted value created because of applying the missing data theory technique (independent variable 3) were operationally named the “Predicted Numerical Value” (posttest value) for each run of the experiment. The absolute error and relative error outcome variable were the delta values calculated, the error approximation values, between the “Original Numerical Value” (pre-experiment’s pretest value) and the “Predicted Numerical Value” (pre-experiment’s posttest value) to determine each missing data theory technique’s predictive accuracy (Idri et al., 2015a, 2015b, 2016a, 2016b, 2016c; Twala et al., 2006). Figure 1 provides a graphical depiction of the study.

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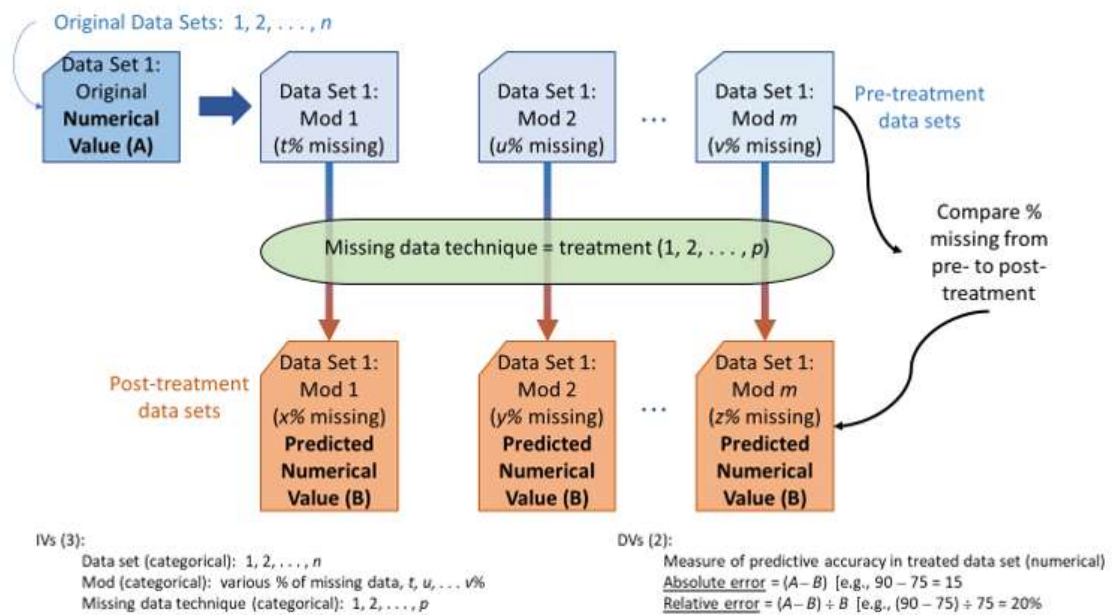
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**Figure**

**12**

*Statistical Method to Perform this One Group Pretest-Posttest Design*



**2 Review of Literature / Theoretical Framework**

This review of the literature provides a scholarly analysis of government documents, government websites, conference proceedings, scholarly peer-reviewed articles, and books within the systems engineering and engineering economics subdiscipline of defense agency software cost estimation training practices. Furthermore, the search supports why applying the theoretical framework of missing data theory should be tested on U.S. defense cost estimation data to fulfil this current gap in the literature. With the cost estimation discipline being faced with data reliability and completeness challenges within

the DoD, this study is narrowly focused on how unreliable and incomplete data matrices are handled in U.S. defense cost estimation data matrices that are software lines of code and effort hour based.

Literature found specifically between 2015-2021 was used to describe the current environment and scholarly review around the U.S. defense software cost estimation, unreliable data, and incomplete data problem. Literature surrounding the seminal theory of missing data and various statistical and machine learning techniques is also referenced from the literature and covers the 1976-2020 timeframe. References include a full range collection of materials for this capstone topic that cites seminal theorists, government documents, government websites, conference proceedings, scholarly peer-reviewed articles, books, and technical reports.

The theoretical framework that grounded this pre-experimental study was missing data theory (see Allison, 2002; Graham, 2012; Little & Rubin, 1987, 2002, 2020; Rubin, 1976). The intent of this study was to ascertain how effective the missing data techniques' measure of predictive accuracy was when applied to the defense cost estimating discipline's variant of the missing data problem, each technique based on missing data theory. Since this theory addressed data completeness, it was most appropriate to use since several years of research have validated that the theory provides effective techniques to fill data gaps in many non-U.S. defense cost estimation disciplines (see Allison, 2002; Enders, 2010; Graham, 2012; Little & Rubin, 2002, 2020). Disciplines that have leveraged missing data theory can be found in the social sciences, health, pharmaceutical industry and practically any industry that requires an assessment of data to inform decision-makers (see Allison, 2002; Blankers et al., 2010; Little & Rubin, 2002, 2020).

This theory was a starting point to determine which missing data theory technique (independent variable 3) could improve the state of the U.S. defense cost estimating data reliability and completeness problem. This framework allowed me to look at missing data through a narrower lens by testing various traditional missing data theory techniques (e.g., complete case analysis/listwise delete, single imputation, and multiple imputation) to inform and update how cost estimators could handle and treat areas of missing data. The theoretical framework provided a basis for answering the RQ: To what degree can traditional missing data theory techniques accurately solve cost estimator's and engineering manager's unreliable and incomplete data problem when data values are missing from a representative U.S. defense cost estimation data matrix? This research can inform the U.S. defense cost estimation discipline about additional options to improve data quality beyond policy incorporation and could offer these options as a new topic to include in future courses and curriculum. Furthermore, this research could inform how this topic is addressed within other academic books and journals involving engineering economics/management, software engineering economics, machine learning data preprocessing, cost analysis, financial decision sciences, data preparation (e.g., data inclusion/exclusion and data cleansing), data mining, and of course Business—Cost Estimating at DAU (see Boehm, 1981,1984, 2002; DAU, 2018a; Farr & Faber, 2018; Fraser & Jewkes, 2013; Gautam & Ravi, 2015; Nagashima & Kato, 2019; Van Hulse & Khoshgoftaar, 2014; Williams & Barber, 2011).

### **3 Research Design / Methodology**

The pretest value was operationally named the “Original Numerical Value” and represents the removed-at random-data-values that were obtained from the Walden University IRB approved purposive sample data that was used for empirical testing. The posttest value was operationally named the “Predicted Numerical Value” and represented the result of the treatment, the applied missing data theory technique, in which I was able to empirically evaluate and measure the predictive accuracy of the treatment’s outcomes on a representative U.S. defense cost estimation data set by measuring its absolute error and relative error values. The independent variables that were used to manipulate this quantitative pre-experimental research design of 30 out of 50 analogous and synthetic software development programs from the purposive data sample were the percentage of missing data (independent variable 1), the missing data theory technique (independent variable 2), and the 28 types of numerical data sets available within the one group data matrix. This study did not have a covariate, mediating, or moderating variable to account for as the subjects within the intervention are data values and not human beings.

There were two evaluative measures used to test the impact of missing data theory techniques by comparing pretest and posttest values. The first evaluative measure, the measure of predictive accuracy in the 28 treated data set were computed based on the delta change between the pretest and posttest values found before and after the treatment. This calculation determined the two dependent variables numerical values, the absolute error and relative error, that helped to compare the pretreatment and posttreatment data sets to measure each missing data theory’s technique predictive accuracy, an aggregate needed to conduct ANOVA testing to determine if the study’s results were significant. The second evaluative measure, significance testing, was performed by conducting a two-way ANOVA with an assumption of normality for a repeated measures ANOVA (see Field, 2018). The two-way ANOVA determined if there is an interaction between the missing data theory technique chosen, the multiple data set types from a representative U.S. defense cost estimation data matrix, and the various percentage levels of missing data (i.e., this pre-experimental study’s three independent categorical variables) to explain the measures of predictive accuracy (i.e., the two dependent/outcome numerical variables) using absolute error and relative error calculations once all experiments have been completed (see Field, 2018). Furthermore, this significance testing used a two-way (within-subject variables) and three between-subjects factors analysis of variance (ANOVA) to measure the effects and interactions that existed between the independent variables and dependent variables (see Field, 2018).

#### **4 Analysis and interpretation /Results & Discussion**

There were 28 data sets in which all 30 synthetic and analogous software programs were used as potential cases for the pre-experimental treatments, randomly resulting in 1,568 trials being conducted as an intervention per each MDT technique.

The degree to which all three empirically tested MDT technique results came closest to the “ground truth” or “Original Numerical Value” is in the summary table on the top right. The estimated marginal means chart on the bottom right provides a graphical illustration that the means are not equal for the dependent variables in each MDT technique that went through all phases. If an interaction occurred between the means, the horizontal blue line and diagonal red line would have touched at least at one or two points. No interaction occurred between the two dependent variables in the SI-Mean or MI-LR techniques.

By empirically evaluating missing data theory techniques’ predictive accuracy, a new method to handle missing data problems for DoD cost estimators, engineering managers/economists, database administrators, data scientists, as well as other researchers could be a welcomed addition to the Defense Acquisition University’s (DAU’s) Business—Cost Estimating current curriculum, as well as adds to the engineering economics scholarly conversation.

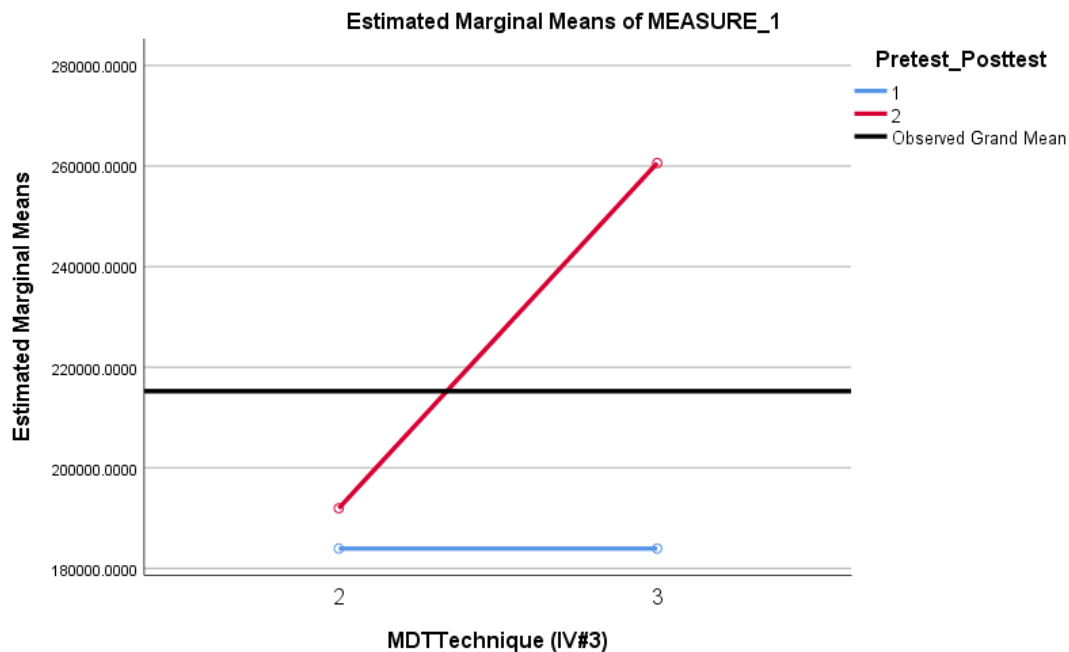
**Table 1**

*Degree to Which Missing Data Theory Techniques Can Solve the U.S. Cost Estimators’ Unreliable and Incomplete Data Problem Based on Approximation Error*

Predictive Accuracy Results (Error)	MDT 1 LD	MDT 2 SI-Mean	MDT 3 MI-LR
Above 100% of Original Value	N/A	47.5%	48.7%
Within 80% or Less of Original Value	N/A	10.1%	8.9%
Within 60% or Less of Original Value	N/A	11.8%	10.9%
Within 40% or Less of Original Value	N/A	14.2%	12.9%
Within 20% or Less of Original Value	N/A	16.4%	18.6%

**Figure 2**

*Plot of the Results to Assess Interaction Between Approximation Error (Dependent Variables) of the Actual/Pretest (1) and Computed Posttest (2) Value Means*



5 Findings / recommendations / conclusions

To further the application of missing data theory to the U.S. defense cost estimation discipline, I modeled the missing data problem by simulating the conditions that defense industry cost estimators, engineering economists, engineering managers, and defense cost estimating repository database administrators experience. I used the pre-experimental study design to apply a missing data theory complete case analysis treatment and two statistical based missing data theory treatments on the same group of randomly selected data from a complete U.S. represented cost estimation data matrix. Complete case analysis did not render data sets more complete; however, single and multiple imputations did restore data sets with values that were within 20% of its “Original Numerical Value(s)” 16.4% and 18.6% of the experiments, respectively. The data matrix contained an appropriate required sample size of 30 DoD software programs and contained 28 data sets to test missing data theory techniques on. The “Predicted Numerical Value”, as determined by each missing data theory technique, served as the posttest value in this experiment and helped calculate the study’s dependent variables, described as its measures of predictive accuracy. Stated differently, the two dependent variables that captured the predictive accuracy for this study were absolute error and relative error. The absolute errors and relative errors were calculated from pretest and posttest values.

To answer the gap in the research, I used the pre-experimental research design of the one group pretest-posttest no control group design (Campbell & Stanley, 1963; Cook & Campbell, 1979; Crammer, 2018; Reichardt, 2019; Shadish et al., 2002; Shek & Zhu, 2018; Singleton & Strait, 2010; Thyer, 2012). Significance testing was performed by conducting a two-way repeated measures ANOVA. The estimated marginal means plot, and the F statistic were used to test the main effects and interaction between variables.

This quantitative research method of inquiry helped determine how well defense cost estimators could handle historical data sets with the use of missing data theory techniques (Crammer, 2018; Kirk, 2013; Shek & Zhu, 2018; Thyer, 2012). By randomly removing data values from a complete data set, an empirical examination of new data values was quantitatively created, assessed, and proved that both single imputation and multiple imputation missing data theory techniques have the ability to improve the unreliable and incomplete data quality problem that is currently experienced in the U.S. defense cost estimation discipline of Business—Cost Estimating.

By conducting this empirical research, I closed a gap in the U.S. cost estimation discipline and added to the research, knowledge, and understanding which serve as rationale for employing additional options for cost estimators to perform more reliable and complete cost estimation products. Major DoD engineering-based acquisition projects and programs cost estimates require reliable and complete data to forecast cost more accurately. The results of this empirical research could provide U.S. defense cost estimators with an evaluation of which one out of three missing data theory techniques could serve as a hands-on-treatment-options that could handle the unreliable and incomplete data problem when building a cost estimate (DAU, 2018a; GAO, 2009, 2020; Morin, 2017).

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# Classification Model for Identifying Postpartum Depression Disorder

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## **Abstract**

*Postpartum Depression or PPD is a type of depression that mainly affects women and, less frequently, men, typically during the first months after childbirth. Apart from Baby Blues which is shown by 50% - 80% of women right after delivery, Postpartum Depression lasts for a few months to years and is severe with a range of serious symptoms such as frequent crying, irritability, fatigue, as well as feelings of guilt, anxiety, and the tendency to harm oneself or one's baby. The extremely severe condition of Postpartum Depression is known as Postpartum Psychosis. In this research, the author aims to analyze the posts shared by users on social media through various techniques in text analytics to understand the emotions underlying the posts. This analysis can aid in building Classification models for the classification of future posts into those with Postpartum Psychosis ideation and Postpartum Depression ideation. The study also attempts to find the association between the most frequently used words in the posts by the users and develop a relationship between them. This study can aid in the diagnosis of Postpartum Depression by Psychologists, Psychiatrists, other Healthcare workers, and the patient's family. The early diagnosis can help provide support and effective treatment to those who need it and can thus prevent severe episodes of Postpartum Depression.*

## **Keywords**

Postpartum Depression, Social-Media, Topic Modelling, Sentiment Analysis, Supervised Machine Learning, Logistic Regression Classifier, Lexicon

## **1 Introduction & design of the study**

Depression is a serious medical condition that has a negative impact on a person's own life and family. According to the World Health Organization (WHO), depression affects 300 million people worldwide. It is characterized by mood changes, a high degree of sadness and anxiety, and a lack of interest in daily activities. Postpartum Depression or PPD is one type of depression that mainly affects women and, less frequently, men, typically during the first months after childbirth. Baby blues is the first phase of Postpartum depression which is followed by the phases, Postpartum depression and Postpartum Psychosis. Baby blues are characterized by less severe symptoms such as

mood swings, anxiety and sleeping disorders which tend to decrease over one or two weeks after delivery. Around one in seven women can develop Postpartum Depression (PPD), a more severe condition than postpartum blues.

While most women recover quickly from the baby blues, postpartum depression (PPD) lasts much longer and has a significant impact on women's potential to return to a normal state. Postpartum depression (PPD) not only affects the mental and physical health of the mother but also her relationship with the child. The symptoms include irritability, frequent crying, feelings of helplessness and hopelessness, lack of energy and motivation, sexual disinterest, eating and sleeping disorders, and the feeling of being incapable of dealing with new situations, as well as complaints of psychosomatic [1]. Another major finding is that half of Postpartum depression (PPD) in new mothers go undiagnosed because of conflict in privacy and not wanting to disclose to close family members [2]. There is also a stigma around new mothers in that disclosure may lead to abandonment and fear of lack of support [3].

The extremely severe case of Postpartum Depression is known as 'Postpartum Psychosis' The symptoms last for a few weeks to several months. Symptoms include extreme agitation, anger, confusion, feelings of hopelessness and shame, insomnia, paranoia, delusions or hallucinations, hyperactivity, rapid speech, mania, suicidal thoughts and self-harming and hating thoughts, which are extremely dangerous. Postpartum Psychosis requires immediate medical attention since there is an increased risk of suicide and harm to the baby. The risk level of the three phases of Postpartum Depression, Postpartum Blue, Postpartum Depression and Postpartum Psychosis, is hard to identify. Still, they are distinguishable to an extent from the symptoms, emotions and expressions persons usually show in these phases [4].

This study has been carried out using multiple techniques starting from the extraction of data from multiple social media platforms such as Reddit, Twitter, and YouTube. After the pre-processing of the textual data, Topic modelling was done for finding the association between the different terms used by the users in the posts. It was followed by Sentiment analysis using VADER and NRCLex. From the output of the sentiment analysis, emotions were clustered as high-risk Postpartum depression-indicative emotions and low-risk postpartum depression-indicative emotions and the same was used for the classification of posts. A manually developed Lexicon was used for the identification of the Postpartum Psychosis medical condition and posts were classified using the newly made classification. Logistic Regression Classifier was used for building an ML model for classifying future posts using Bag of words and tf-idf methods.

## 2 Review of Literature

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A study [5] conducted among women at 4 to 6 weeks postpartum by collecting data during onset postpartum, pregnancy, or predating pregnancy study emphasized finding the exact mental disorder the person is having postpartum, such as bipolar and unipolar disorder, and observed that recognizing the actual mental disorder is the most critical prerequisite for adequate treatment. The study also found that half of the women with 'treatment-resistant' Postpartum Depression (PPD) have bipolar disorder. The study concluded by recommending that the strategies improve the diagnostic precision for identifying women with mental illnesses like anxiety disorder and bipolar disorder.

The aim of the community-based cross-sectional study [6] conducted among 526 women who gave birth in the Gondar town of Northwest Ethiopia for six weeks was to translate



the findings from the study to healthcare professionals and to mothers to improve care related to Postpartum Depression (PPD). A cluster sampling technique was used to determine the prevalence and associated factors of postpartum depression among women. The research found that the factors that are associated with increased Postpartum Depression (PPD) include women who have had a previous history of depression, abortion history, low birth weight newborn, gave birth prematurely, had an unplanned pregnancy, had no ANC (Antenatal Care) follow up, and had no PNC (Postnatal Care) follow up. The study found that women who have high risks of Postpartum depression had relatives with a history of mental health issues.

To predict pregnant cases from Twitter data, [7] describe an ensemble strategy based on long short-term memory (LSTM) and CNN paired with a support vector machine (SVM) classifier. One of the contributions of this research is an exploratory sentiment analysis study on pregnant women's accounts. This study identified and prioritized phrases most typically associated with physical and behavioural disorders based on data obtained from Tweets. The writers divided pregnancy-related emotions into four categories: neutral, pleased, distressed, and annoyed. The findings of this study pointed in the direction of supporting the identification of pregnant sentiment classes. [8] proposed a context-aware recommender system based on text mining for monitoring postpartum depression. The proposed method used the text data collected from pregnant women through documents to build the predictive model, which will classify the sentences into happiness and sadness. The model performance is evaluated using metrics associated with the confusion matrix. The proposed model showed a reliable performance in all metrics, mainly when classifying new cases. Hence, the results obtained by the model will be useful to health professionals in monitoring high-risk postnatal women.

### 3 Research design

#### 3.1 Problem Statement

Postpartum Depression (PPD) has developed as a significant health concern in the recent past. It is hard to diagnose the presence of Postpartum Depression, and its phase in women, since its symptoms largely vary from person to person. The potential risk factors of Postpartum Depression demand the diagnosis of this mental disorder since early detection can help in effective treatment models in mothers. The posts by mothers on social media are a huge and sensible source of textual data concerning Postpartum Depression, but how to use this data for treatment remains an issue.

#### 3.2 Objectives

The objectives of the research are,

- 1). Extract significant associations of keywords within the data using topic modelling
- 2). To find underlying emotions of posts that people share on social media using techniques such as VADER and NRCLex sentiment analysis and classify the posts into Postpartum Psychosis and Postpartum Depression ideations to build a supervised machine learning model for classifying the future data into different phases of Postpartum Depression.

#### 3.3 Techniques Used

- 1). Visualization using Word Cloud
- 2). Topic Modelling
- 3). Sentiment Analysis – VADER Sentiment Analysis and NRCLex Sentiment Analysis
- 4). Model building – Logistic Regression model using tf-idf

Fig 1 shows the methodology followed throughout the research.

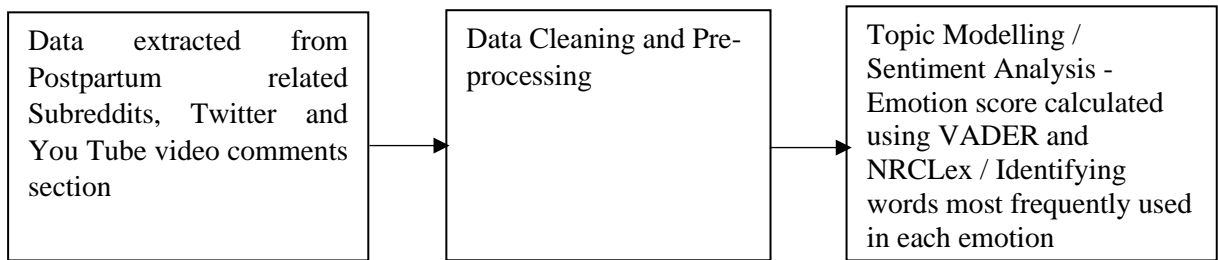
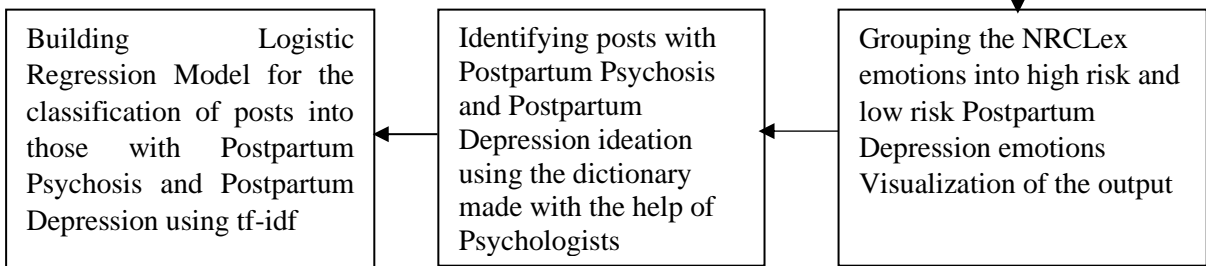


Fig 1: Flowchart of



methodology

### 3.4 Data Understanding

The text data used in this research was collected from various social media platforms, including top posts from Reddit in the following subreddits: r/Postpartum\_Depression, r/Postpartumdepression, r/Postpartum\_Anxiety, the personal experiences of people which were given as the comments for the posts in Reddit, posts shared in Twitter, and their respective comments and the comments under the Postpartum Depression related YouTube videos. The data extraction from Reddit was done in Python using APIs from Reddit (Fig 2), and the rest was collected manually by scraping textual data from other social media platforms such as Twitter and YouTube (Fig 3).

	title	body
0	Reddit PPD network	I have added other subreddits that specialize ...
1	Medication	Has anyone been prescribed a medication other ...
2	Shout into the void	I have no one to really talk to about this bec...
3	Don't Give Up	I'm almost 11 months postpartum. 10 of those m...
4	Meds	Hi all, I was hit with severe PPD. I never fel...

Fig 2: Extracting posts using PRAW from Postpartum Depression related subreddits

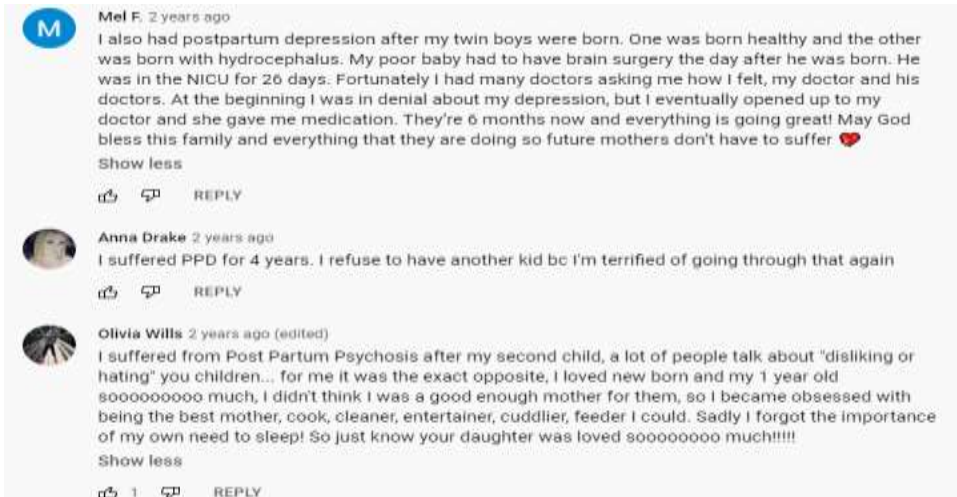


Fig 3: Example of posts collected from YouTube

### 3.5 Data Pre-processing

The pre-processing of data includes the following steps.

- 1). The data from the Reddit posts that were used is the body of the posts. If there was no body to the post (if the user has posted an image or a link), the post’s title was used as the body of the post.
- 2). HTML tags, URLs, and digits were removed from the text and Tokenization and Lemmatization were done

The data obtained after pre-processing is shown in Fig 4.

	body
0	add ppd ( ) support please notify mod know giv...
1	anyone prescribe medication ssris helped ' try...
2	talk ' friend ' want worry family husband ... fe...
3	' month postpartum month suffer deep depressio...
4	hit severe ppd never feel bad life n hormone p...

Fig 4: Data obtained after pre-processing

### 3.6 Modelling

3.6.1 Visualization using Word Cloud: Visualization using word cloud gives a glimpse of the terms that the users mostly used in social media posts.

3.6.2 Topic Modelling: Topic modelling was applied to the data to derive the association between the terms, and the output was interpreted. Visual topic modelling was used to represent the topics of the content. A coherent score was found for the model building and focus was given to getting human-interpretable topics.

3.6.3 VADER Sentiment Analysis: As part of model building, VADER sentiment analysis was applied to the body of the text. VADER sentiment analysis scores were calculated for each row in the data and based on these scores, the texts were classified into Positive (VADER score > 0.5), Neutral (0 < VADER score < 0.5) and Negative (VADER score < 0).

3.6.4 NRCLex Sentiment Analysis: The model building was done by NRCLex sentiment analysis and the output generated is a dictionary of all the emotions that the post is portraying as the key and the score of the emotions as the values. From this dictionary of emotions of each sentence, the emotion that has the highest score for the particular set of text is found and is considered the emotional effect of that sentence.

The study is focused on building an unsupervised model to cluster posts into two main categories: High-risk and Low-risk Postpartum Depression. Once the emotions of each post have been identified, words with the topmost frequency under each emotion were studied to group these emotions into clusters that indicate high-risk and low-risk Postpartum Depression. The classification of emotions into two clusters (High-risk Postpartum Depression indicative and Low list Postpartum Depression indicative) was based on the information collected from psychologists. The same was used for creating the dictionary of words for differentiating Postpartum Depression and Postpartum Psychosis.

### 3.6.5 Building Machine Learning Model using Logistic Regression Classifier

After identifying the most frequent words used by the patients during Postpartum Depression, a lexicon was made containing the terms that denote the symptoms/thoughts of persons during the Postpartum Psychosis stage with the help of Psychologists. This dictionary was used to classify the texts into those with ‘Postpartum Psychosis’ and ‘Postpartum Depression.

**Dictionary:** {hate, hurt, hopeless, kill, "guilt", "harm", "psychosis", "suicidal", "suicide", "failure", "suicides", "worthless", "harming", "harmed", "hurting", "hurtful", "psycho", "bipolar", "psychotic", "psychopath", "hated", "hating", "regret", "regretted", "regretful", "regrets", "regretting", "guilt", "guilty", "hatred", "dying", "die", "rage", "anger", "angry", "delusion", "delusions", "delusional", "scared", "scares", "scaring", "scary", "hallucinations", "hopelessness", "killing", "screaming", "scream"}

A Logistic Regression Classification Model for classifying the posts into two different stages of postpartum depression, i.e., Postpartum Psychosis and Postpartum Depression, was made using the classification data as the input, and the accuracy score was calculated using the tf-idf methodology.

## 3 Results

The methodology used for the research brings out the association of words used by people struggling with postpartum depression and their emotions. The outputs of the work are analyzed with the help of medical practitioners to interpret the results in connection with the requirement of the healthcare industry, specifically in the field of psychology.

### 4.1 Analysis using Word Cloud

Fig 5: Word Cloud obtained from the posts



Fig 5 shows the word cloud obtained from the text used for analysis. The visualization indicates that many users have used words such as ‘ppd’ (Abbreviation of postpartum depression), anxiety, baby, support etc. Other most frequently used words are weight, depression, please, miss, sad, abusive, relationship, “newborn”, and postpartum.

### 4.2 Topic Modelling

The topic modelling was carried out to find the association between different terms. Through several iterations, irrelevant words were removed from the text for getting better results (Human interpretable topics). The focus was on deriving associations between the terms with the number of topics. Visualizations were made to check the relevance and distinctiveness of the topics.

```

1(0,
  "0.051**baby" + 0.027**husband" + 0.025**need" + 0.023**try" + 0.021**sleep" +
  "+ 0.022**work" + 0.021**tell" + 0.017**come" + 0.015**back" + 0.014**home"),
(1,
  "0.037**guilt" + 0.035**bond" + 0.029**slowly" + 0.018**badly" +
  "0.014**episode" + 0.013**session" + 0.012**degree" + 0.012**awhile" +
  "0.012**toddler" + 0.012**fatigue"),
(2,
  "0.051**friend" + 0.051**family" + 0.032**live" + 0.028**miss" + 0.020**run" +
  "+ 0.017**dinner" + 0.014**covid" + 0.014**set" + 0.014**single" +
  "0.012**pay"),
(3,
  "0.045**cry" + 0.023**enough" + 0.015**heart" + 0.014**easy" +
  "0.014**scream" + 0.013**hold" + 0.011**sit" + 0.011**head" + 0.011**scared" +
  "+ 0.011**nurse"),
(4,
  "0.044**hospital" + 0.032**nicu" + 0.023**traumatic" + 0.023**birth" +
  "0.018**labor" + 0.016**blood_pressure" + 0.015**section" + 0.014**pump" +
  "0.013**test" + 0.013**low"),
(5,
  "0.024**ptsd" + 0.024**result" + 0.021**mental_illness" + 0.021**bipolar" +
  "0.020**snap" + 0.018**increase" + 0.018**blue" + 0.018**due" + 0.016**dose" +
  "+ 0.015**piece"),
(6,
  "0.059**help" + 0.033**ppd" + 0.028**really" + 0.023**depression" +
  "0.025**well" + 0.024**postpartum" + 0.021**talk" + 0.021**find" +
  "0.021**start" + 0.018**anxiety"),
(7,
  "0.009**feel" + 0.036**want" + 0.034**know" + 0.022**think" + 0.020**good" +
  "0.020**son" + 0.020**mom" + 0.019**bad" + 0.018**life" + 0.018**wuch")]

```

Fig 6: Topic Modelling output for the number of topics = 8

Fig 6 shows the result for topic modelling when the number of topics = 8. Although we cannot make sense out of all the terms in a row, we can relate between words such as,

- 1). “guilt”, “bond”, “slowly”, “badly”, “episode”, “awhile”, “toddler”, “fatigue” – Indicate the symptoms and experiences that the patients have during Postpartum Depression. The terms “guilt” and “fatigue” are the symptoms, and “badly” indicates the experience. People with depression will take time to build a bond with the toddler, and it will be slower. The terms give an idea about the symptoms, experiences as well as bonding of mother and child during the depression stage.
- 2). “hospital”, nicu”, “traumatic”, “birth”, “labor”, “blood\_pressure”, “section”, “pump”, “low” – Indicates the experiences in the hospital during childbirth. The word “traumatic” denotes the painful experiences the mother went through during the “labor”.
- 3). “pstd”, “result”, “mental\_illness”, “bipolar”, “increase”, “blue”, “due”, “dose” – pstd or Post-Traumatic Stress Disorder and Bipolar Disorder are mental disorders which can increase the chances of occurrence of baby blue as well as mental illness. People with such illnesses need medication and extra doses for their treatment. The topic is the impact of existing mental disorders on depression.

The perplexity score and coherence score for topics = 8 are -7.34 and 0.37, respectively.

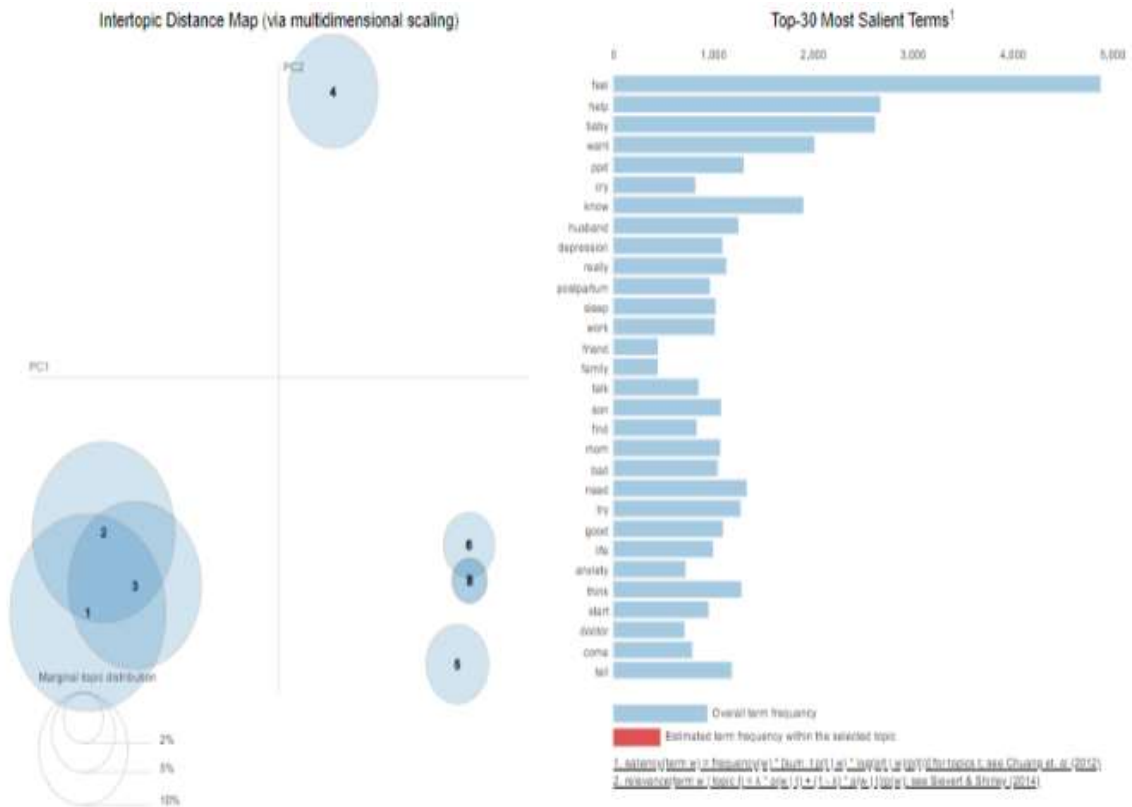


Fig 7: Visualization of topic modelling output when the number of topics = 8

In Fig 7, topic 1,2,3 clustered together to talk about Postpartum depression experiences and the need to speak to others about what you feel, and topic 5,6,7,8 clustered together to show the influence of already existing mental disorders on postpartum depression and the need to talk about what you feel. Topic 1 has the highest topic prevalence, constituting 30.7% of the tokens.

### 4.3 VADER Sentiment Analysis

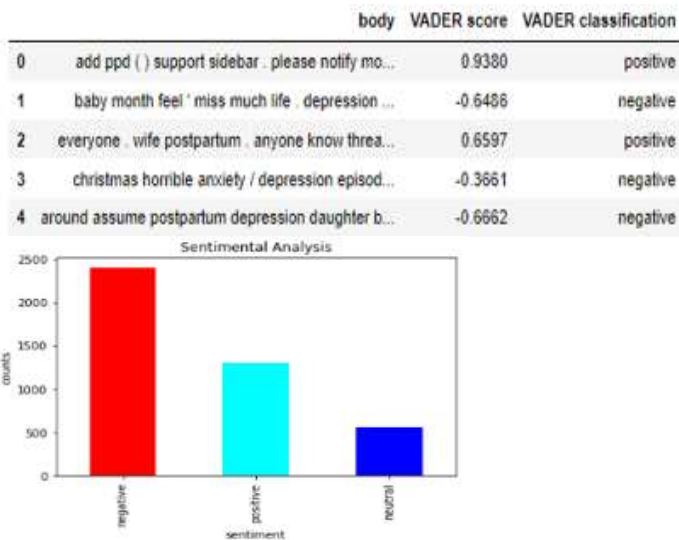


Fig 8 (a) VADER Sentiment analysis classification (b) Count of negative positive and neutral sentiments obtained using VADER

Sentiment analysis was done on the textual data using VADER and NRCLex packages. For VADER sentiment analysis, the posts were classified into ‘positive’ (VADER score  $\geq 0.5$ ), ‘neutral’ ( $0 < \text{VADER score} < 0.05$ ) and ‘negative’ (VADER score  $< 0$ ) on the basis of the VADER sentiment score.

Fig 8 (a) shows the output of the VADER Sentiment analysis and Fig 8 (b) indicate that more than half of the texts were classified as “negative” followed by ‘positive’ and ‘neutral’. This gives an idea about the distribution of texts across positive, negative and neutral classes.

#### 4.4 NRCLex Sentiment Analysis

The result of NRCLex sentiment analysis is shown in Fig 9 and the visualization is in Fig 10.

	body	VADER score	VADER classification	affect_dict	emotion_scores	Emotion
0	added specialize ppd support sidebar please no...	0.9324	positive	{'specialize': ['trust'], 'missing': ['fear', ...	{'trust': 1, 'fear': 1, 'negative': 1, 'sadnes...	fear
1	anyone switch sertraline wellbutrin ' sertral...	0.8442	positive	{'increase': ['positive'], 'enjoying': ['antic...	{'positive': 3, 'anticipation': 1, 'joy': 1, '...	positive
2	currently months pp zolofl weeks ' helping [...	0.2960	neutral	{'long': ['anticipation']}	{'anticipation': 1}	anticipation
3	six months post partum third child think survi...	0.9649	positive	{'child': ['anticipation', 'joy', 'positive'],...	{'anticipation': 7, 'joy': 3, 'positive': 13, ...	positive
4	think depressed feel super sync head body felt...	0.9838	positive	{'depressed': ['anger', 'fear', 'negative', 's...	{'anger': 4, 'fear': 4, 'negative': 7, 'sadnes...	positive

Fig 9: NRCLex Sentiment Analysis Classification output

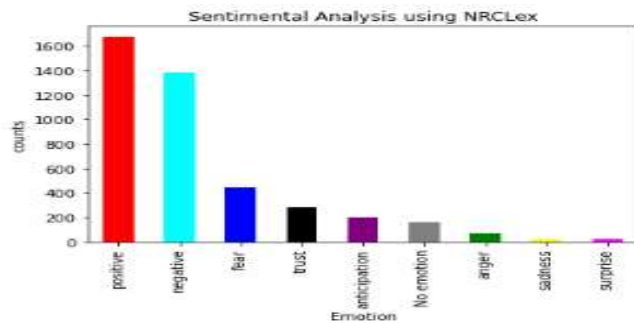


Fig 10: Count of emotions obtained using NRCLex sentiment analysis

From the output of NRCLex sentiment analysis, the most frequently occurring words under each emotion were found (Table 1) and used to decide which emotion should be considered under low-risk ppd and high-risk ppd. Emotions that have words related to symptoms of postpartum depression in high frequency are grouped under the high-risk postpartum indicative class. The emotions that represent more positive words were classified under the low-risk postpartum depression indicative class.

Cluster	Emotions output from NRCLex
Low-risk ppd	Trust, Positive, Anticipation, Surprise, Joy
High-risk ppd	Fear, Anger, Sadness, Negative, Disgust

Table 1: Cluster and the emotions associated with each cluster

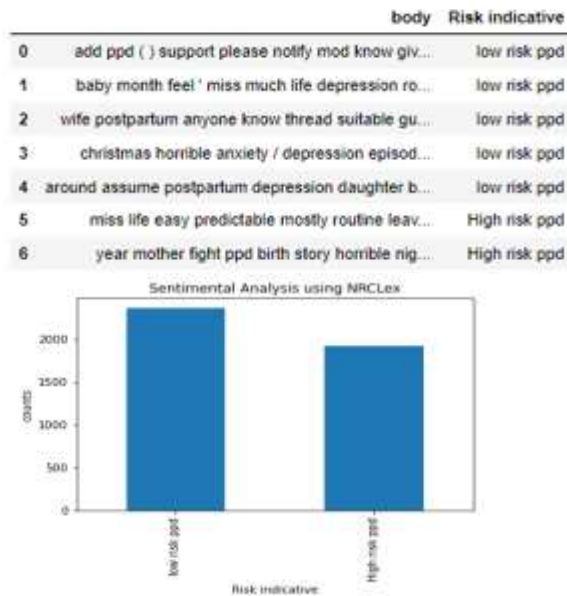


Fig 11: (a). Classification of posts into low-risk and high-risk ppd b). count of total cases classified under low-risk ppd and high-risk ppd

Fig 11 (a) shows the output after classifying the posts into low-risk ppd indicative and high-risk ppd indicative as per the clusters made from the NRCLex sentiment analysis. Fig 11 (b) shows the count of total cases classified under low-risk ppd and high-risk ppd. Fig 11 (b) indicates that there are a more significant number of low-risk Postpartum Depression cases than that high-risk Postpartum Depression cases.

### 3.5 Classification of posts into Postpartum Psychosis and Postpartum Depression based on Lexicon developed with the help of medical practitioners

Using the two labelled classes – Postpartum Psychosis and Postpartum Depression- as the target variable, a machine learning model was built using a Logistic Regression Classifier. The classification output of the logistic regression model is given in Fig 12 (a) and the count of the resulting classifications; Postpartum depression and Postpartum Psychosis is shown in Fig 12 (b).



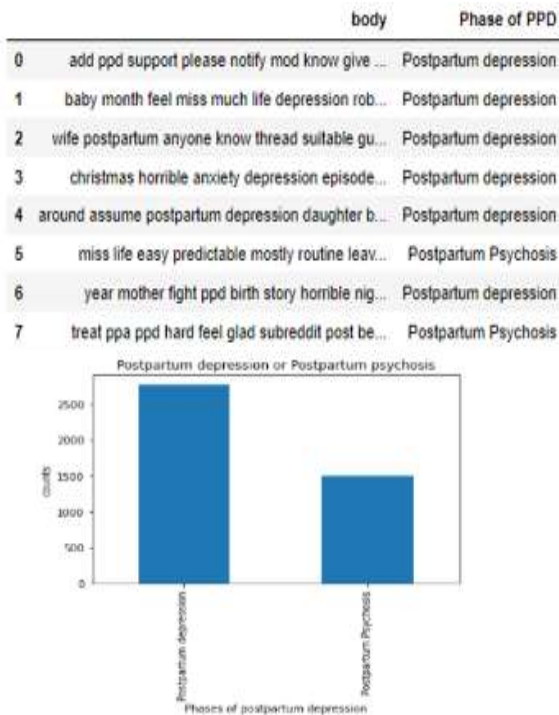


Fig 12: (a). Classification of posts into Postpartum depression and Postpartum Psychosis  
 b). Count of cases classified under Postpartum depression and Postpartum Psychosis

The supervised ML model built using the Logistic Regression Classifier can classify posts regarding postpartum depression. The model will help categorize the posts into Postpartum Psychosis and Postpartum Depression, which will aid the medical practitioners in supporting the patients with effective treatment. The tf-idf technique of the Logistic Regression Classifier gave an accuracy of 73.71% for the model.

### 5 Findings

The topic modelling technique applied to the text data gave the association between terms such as “bipolar”, “posted”, “mental\_illness”, “due”, “ppd” etc., shows the impact of existing mental disorders on the onset of Postpartum Depression. The association of terms such as “postpartum”, “anxiety”, “doctor”, “medication” etc., indicates the importance of seeking medical help during the postpartum depression when symptoms like anxiety are shown. Most of the topics derived from the analysis of Topic modelling output are human-interpretable. They can help medical practitioners and the patients’ families get aware of the various perspectives of Postpartum Depression (PPD).

The classification of high-risk postpartum indicative posts and low-risk postpartum indicative posts based on the output of sentiment analysis techniques such as VADER and NRCLex can help identify and treat the patients who require support from Psychiatrists. The VADER Sentiment analysis helps find the Positive, Neutral and Negative posts, whereas NRCLex helps find the underlying emotions. The manually made lexicon-based Supervised Machine Learning Classification models like the Logistic Regression Classifier proposed in this work can classify posts into Postpartum Psychosis and Postpartum Depression.

### Conclusion

Text analytics applications in the healthcare domain, specifically in psychiatry, are many but not utilized effectively. This work aims in applying techniques such as Topic modelling, Sentiment analysis and Machine Learning model building on the textual data for the study and classification of posts shared by users on postpartum depression in

various social media platforms. Through the development of this research, it is possible to validate a model for emotion classification in texts classification of different phases of Postpartum Depression techniques in which its use in medicine tends to increase. The goal is to provide healthcare professionals with a leading tool to aid Postpartum Depression prevention, thus avoiding more complex risk situations. As further work, a more developed Lexicon based on the studies conducted so far can be used for the classification, and other machine learning algorithms can also be used. Besides, developing the Web application to make the model a tool for daily use by pregnant women and their families and health professionals for better monitoring the high-risk depression cases is another scope.

Postpartum Depression (PPD) is a highly prevalent psychiatric disorder in postnatal women. Perinatal mental illness is underdiagnosed and may have far-reaching ramifications for the mother, her infant, her relationships with her partner and other family members. Early screening and diagnosis are crucial. This study has social implications for healthcare providers and society regarding Postpartum Depression. Healthcare professionals should regularly consult screen mothers during antepartum and postpartum visits by asking a few simple questions or through forms. Early identification of women at high risk for developing Postpartum Depression and initiation of timely therapeutic approaches, consisting of the combination of pharmacological strategies and psychotherapeutic approaches, are the key factors to the successful management of Postpartum Depression. Prospective studies higher in the hierarchy of evidence is the need of the hour to provide guidelines on prevention and treatment interventions for postpartum psychiatric disorders.

#### Acknowledgements

We are deeply indebted to Psychiatrists, Psychologists and other healthcare workers who have supported and contributed to this research by sharing their knowledge in the field of Postpartum depression.

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# Commercial Crop estimates using Deep Learning on GIS based Hyperspectral Imaging

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**Abstract:** *Every year the Directorate of economics and statistics releases advance estimates of production of commercial crops using various estimates. These estimates are done using field surveys and most of the time it is published very late. The estimates can be more accurate and done faster using satellite imagery and deep learning algorithms. Early estimates help the ministry of agriculture to take corrective measures and ensure food grain stability in terms of stocks and price. The Indian space research organization (ISRO) has multiple satellites collecting Hyperspectral image data. This hyperspectral image data is overlapped with layers of GIS data to build a dataset which gives exact location of each pixel up to a resolution of 1 meter. In Hyperspectral image data each pixel has many bands of light intensity data instead of just three bands: red, green, and blue. Hyperspectral imaging collects data to generate a “data cube” or “image cube” that can reveal objects and information which conventional multispectral scanners cannot pick up. Each element leaves a unique spectral signature, also called spectral reflectance curve, in various bands of the spectrum, based on their spectral reflectance. Deep learning is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Deep learning algorithms for image classification like Convolutional Neural Networks (CNNs), Multilayer Perceptron’s (MLPs) and Self Organizing Maps (SOMs) help in quickly analysing the hyperspectral image data, classifying, and recognising the type of commercial crop to generate accurate, quick, and low cost estimates. This research paper uses hyperspectral image data with CNN to estimate different crops.*

**Keywords:** Hyperspectral Imaging, Deep learning, GIS, Crop estimates.

# Image/Video Analysis - Fruits recognition using Inception V3 Model

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## **Abstract**

*In this paper dataset of images containing fruits. We also present the results of some numerical experiment for training a neural network to detect fruits(Inception V3). We discuss the reason why we chose to use fruits in this project by proposing a few applications that could use such classifier. The proposed system also grades the fruit based on the percentage of infection.*

## **Keywords**

Object Recognition, Computer Vision, CNN, Image Processing, Inception V3

## **I.Introduction**

The aim of this paper is to trained a deep neural network that was able to identify fruits from images. This is part of a more complex project that has the target of obtaining a classifier that can identify a much wider array of objects from image.

Digital image processing and Neural Network techniques are very popular and useful for image classification and identification of fruits respectively. This work is done based on the color, size, and shape of the fruit. To detect the infections in fruits, convolutional neural networks techniques are used as per size and color. For computer technology, this model is using a convolutional neural network used for classify the images and object recognition. A convolutional neural network works on image, sound and text analytics. TensorFlow is an open source artificial intelligence developed by Google. It helps the developers to create a neural network which can have many layers in it. TensorFlow is mostly used for classification, predication and so on.

## **II.Related Works**

propose hardware to detect the quality of the fruits. In this paper, they have classified the fruits in low and high based on the quality of fruits. propose a technique for classifying the flowers by considering their color, contour, and texture. Inception model and transfer learning are applied for the flower classification and retraining their image datasets. Using image processing techniques. In this color and texture are used for disease detection. They have used two types of datasets one is the training of images and another one is testing images.

Our proposed system helps the buyers to pick the good quality fruits from assorted fruits. Thus the objective of the proposed work is to help the buyers to select the best fruits from the farmers without wasting their time.

### **III. Literature Review**

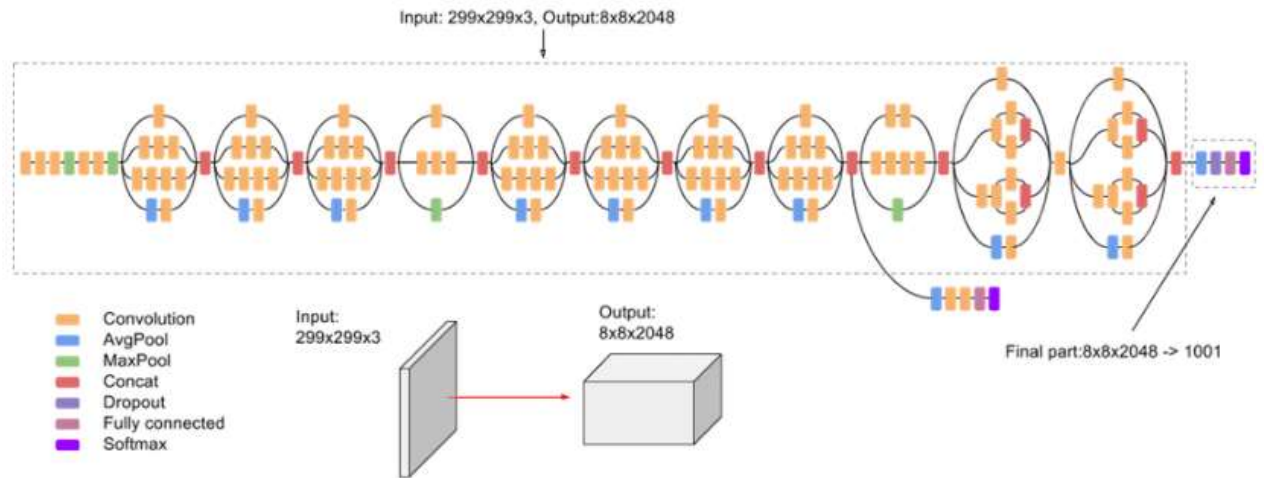
Inception V3: **Inception v3** is a convolutional Neural Network for assisting in image analysis and object detection, and got its start as a module for Googlenet. It is the third edition of Google's Inception Convolutional Neural Network, originally introduced during the ImageNet Recognition Challenge. The model itself is made up of symmetric and asymmetric building blocks, including convolutions, average pooling, max pooling, concatenations, dropouts, and fully connected layers. Batch normalization is used extensively throughout the model and applied to activation inputs. Loss is computed using Softmax.

Deep Learning: Deep learning is a class of machine learning algorithms that use multiple layers that contain nonlinear processing units. Each layer uses the output from the previous layer as input. Deep learning algorithms use more layers than shallow learning algorithms. Convolutional neural networks are classified as a deep learning algorithm. These networks are composed of multiple convolutional layers with a few fully connected layers. They also make use of pooling. This configuration allows convolutional networks to take advantage of bidimensional representation of data. Another deep learning algorithm is the recursive neural network. In this kind of architecture the same set of weights is recursively applied over some data. Recurrent networks have shown good results in natural language processing.

Yet another model that is part of the deep learning algorithms is the deep belief network. A deep belief network is a probabilistic model composed by multiple layers of hidden units. The usages of a deep belief network are the same as the other presented networks but can also be used to pre-train a deep neural network in order to improve the initial values of the weights. This process is important because it can improve the quality of the network and can reduce training times. Deep belief networks can be combined with convolutional ones in order to obtain convolutional deep belief networks which exploit the advantages offered by both types of architectures.

### **IV. Methodology**

Inception v3 model is mostly used in image recognition and it is a predefined convolutional neural network.



In total, the inception V3 model is made up of 42 layers which is a bit higher than the previous inception V1 and V2 models. But the efficiency of this model is really impressive. We will get to it in a bit, but before it let's just see in detail what are the components the Inception V3 model is made of.

TYPE	PATCH / STRIDE SIZE	INPUT SIZE
Conv	3×3/2	299×299×3
Conv	3×3/1	149×149×32
Conv padded	3×3/1	147×147×32
Pool	3×3/2	147×147×64
Conv	3×3/1	73×73×64
Conv	3×3/2	71×71×80
Conv	3×3/1	35×35×192
3 × Inception	Module 1	35×35×288
5 × Inception	Module 2	17×17×768
2 × Inception	Module 3	8×8×1280
Pool	8 × 8	8 × 8 × 2048
Linear	Logits	1 × 1 × 2048
Softmax	Classifier	1 × 1 × 1000

The above table describes the outline of the inception V3 model. Here, the output size of each module is the input size of the next module.

**ARGS:**

<b>Include Top</b>	<b>Boolean, whether to include the fully-connected layer at the top, as the last layer of the network. Default to True</b>
<b>Weights</b>	<b>One of None (random initialization), imagenet (pre-training on ImageNet), or the path to the weights file to be loaded. Default to imagenet</b>
<b>Input Tensor</b>	<b>Optional Keras tensor (i.e. output of layers input()) to use as image input for the model. input_tensor is useful for sharing inputs between multiple different networks. Default to None.</b>
<b>Input Shape</b>	<b>Optional shape tuple, only to be specified if include_top is False (otherwise the input shape has to be (299, 299, 3) (with channels_last data format)</b>



	<p>or (3, 299, 299) (with channels_first data format). It should have exactly 3 inputs channels, and width and height should be no smaller than 75. E.g. (150, 150, 3) would be one valid value. input_shape will be ignored if the input_tensor is provided.</p>
<b>Pooling</b>	<p>Optional pooling mode for feature extraction when include_top is False.</p> <ul style="list-style-type: none"> <li>• None (default) means that the output of the model will be the 4D tensor output of the last convolutional block.</li> <li>• avg means that global average pooling will be applied to the output of the last convolutional block, and thus the output of the model will be a 2D tensor.</li> <li>• max means that global max pooling will be applied.</li> </ul>
<b>Classes</b>	<p>optional number of classes to classify images into, only to be specified if include_top is True, and if no weights argument is specified. Default to 1000.</p>
<b>Classifier Activation</b>	<p>A str or callable. The activation function to use on the "top" layer. Ignored unless include_top=True. Set classifier_activation=None to return the logits of the "top" layer. When loading pretrained weights, classifier_activation can only be None or "softmax".</p>

## V. Experiments and Results

The proposed system consists of three steps such as

- Dataset collection
- Training the model
- Results

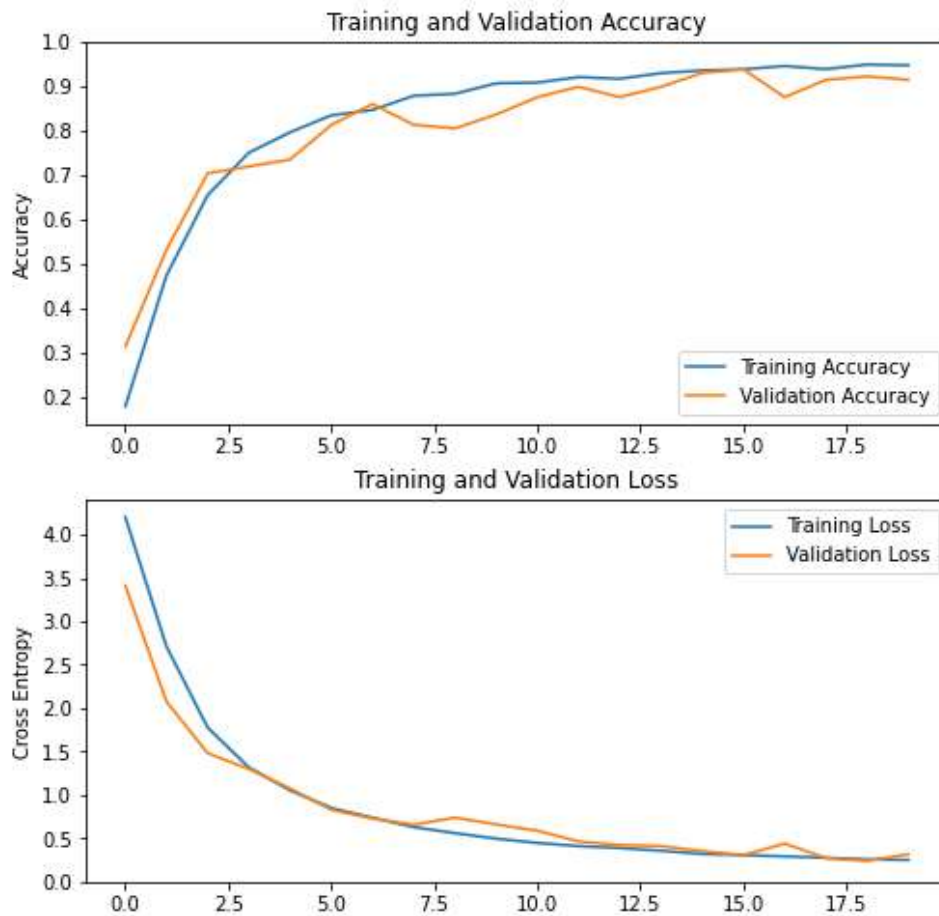
Training set size: 67692 images (one fruit per image).

Test set size: 22688 images (one fruit per image).

The number of classes: 131 (fruits).

Image size: 100x100 pixels.

Accuracy: 93.75%



## VI. CONCLUSION

In this paper, it is proposed to find how much percent the fruit is affected and recognize the fruit in the given image. This feature is very useful for the farmers and useful for different purposes. Identification of fruit diseases Inception v3 model and Transfer Learning are used.

We can also add some more features to model so that the fusion of image processing and deep neural network not only useful for the fruit disease detection but also useful detecting diseases in vegetables and plants and completely helpful for the agricultural industry.

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# Factors Influencing Consumer Buying Behaviour Towards Mobile Phones

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## **Abstract**

*Mobile phones are an unignorable aspect of modern society. They are everywhere and have taken over most work that desktop computers used to do. According to a previous market research study, the penetration rate of smartphones in India reached 54 percent and was estimated to reach 96 percent in 2040, more than doubled from financial year 2016, when only around 23 percent of the total population were using smartphones (Statista, 2020). With technological advances and innovations slowing down, the mobile phone market has become stagnant. The purpose of this study is to investigate and analyse what factors affect the buying behaviour of mobile phones of people in India in the age group 16-24. Be it the features and specifications, price, brand or the way it looks, the objective is to find out what exactly consumers are looking for in a mobile phone and to establish relationships between the various factors that influence a buying decision. The implication of this study is to ideally allow manufacturers and brands to gain a better idea of what consumers consider important in a mobile phone. This study utilises quantitative analysis of the data provided by 212 respondents, who answered a self-administered structured questionnaire. The study results revealed that the factors like features and specifications of a phone, brand, price, and demographic factors have a major influence on consumer buying behaviour toward mobile phones.*

## **Keywords**

Consumer Buying Behaviour, Mobile Phones, Branding, Brand Loyalty, Consumer Motivation

## **1. Introduction**

The mobile phone is one of the most personal items human beings use today. Ever since the Motorola DynaTAC in 1983, mobile phones have come a long way in the last 40 years. People have gone from regular brick-like phones from the DynaTAC to reduction in size, like the Nokia phones in the early 2000s, to the small smartphones in the early 2010s, all the way till now where phones the size of yesteryear's tablets can be found for under INR 10,000. By 2022, phones have come so far that the market has become very stable and stagnant. The design preferred by all phones as of now is the candy bar design. As of 2013, majority of the consumers owned Nokia mobile phones. Moreover, most of Nokia mobile phone users had a plan to shift to other brands such as Samsung, Apple, and BlackBerry. Also, price was the dominant factor affecting the decision to buy a mobile phone (Mesay Sata, 2013).

Also as of 2013, Nokia was still the most used brand of mobile phone devices but other companies such as Samsung, HTC, Apple had almost caught up and most people were planning to upgrade to one of those brands' devices since they had better technology,

offered more value for their money and made their lives a lot easier due to the convenience they offered (Mesay Sata, 2013).

What had changed though, in terms of mobile phone usage, since 2009, is the average amount of time that users interacted with their devices. According to a study in 2009, the average amount of time spent by people using their smartphones was 2-3 hours a day, with a minimum of 1 hour and a maximum of 5-6 hours. (Bishal Nagarkoti, Helsinki, 2009) Nowadays, according to Statista, an average smartphone user spends about 5-6 hours on average using their smartphone, not including work-related use (Statista, 2021).

By large, Apple and Samsung repeatedly dominate the industry today. This has led to a stagnant industry with little innovation. This has also resulted in dissatisfaction amongst the consumer-base portrayed on social media and forums. This study aims to find out what aspects of mobile phones consumers really consider important by analysing the factors influencing their buying behaviour and establishing relationships between them.

## 2. Review of Literature

WAP-enabled mobile phone devices were used more by young and tech-savvy consumers whereas the elderly and conventional stuck to newspapers and forums. (T.S.H. Teo, Siau Heong Pok. 2002) As of the time of the research, WAP-enabled devices had had a lot of negative reports in the media with regards to convenience, ease-of-use, and overall optimisation. In 2003, people found it difficult to think that the internet could be a big thing in the future and that they would be able to access it from the palm of their hands but that has happened and everyone always has some form of internet today.

It was found that, in 2002, most of the mobile phones owned were Nokia phones. This was normal as it was in Finland, where over 80% of the mobile phones being used were Nokia (Nykänen, 2002). The study showed overall that most of the participants bought mobile phones purely for phone calls and not much else. They did not seem to care and did not even know of newer technologies such as WAP and GPRS. They did not buy mobile phones as smartphones or PADs to browse the web or check their emails. They were also price sensitive and did not believe that spending over 150\$ on a mobile phone was a smart investment. Demographic factors such as gender and occupation were large variables affecting choice. The size of the mobile phone and the brand it comes from had a large effect on choice. (Heikki Karjaluoto, Jari Karvonen, Manne Kesti, Timo Koivumäki, Marjukka Manninen, Jukka Pakola, Annu Ristola, Jari Salo, 2004)

By 2006, according to a study by Saowalak Uampranee in Bangkok, specifications and performance were quoted to be the most important factor when it came to choosing a mobile phone. At the time, smartphones were slowly coming onto the industry as a means of merging pagers, PDAs and conventional mobile phones. These smartphones came at a great cost, though, and not many could afford them. Almost no-one bought such expensive products online. They preferred to go to physical stores and try out the phones.

According to a study done by Bishal Nagarkoti (2009), participants seemed to all agree that buying expensive smartphones was worth it because of the durability they offered, the computing capabilities, the better cameras, amongst others. Participants mentioned that they bought an expensive smartphone because of the large availability of applications in a unified app store. Most of the participants that are single and young were easily willing to spend a lot of money on a smartphone as they do not have any familial obligations or must worry too much about savings.

A study done by Shashikumar Sharma (2010) showed that consumers regarded warranties offered as a big factor in choosing a mobile phone. Youth buyers were heavily influenced by brands that they preferred.

According to a study done by Mandusha Maharaj and Brijball Parumasur (2011) in South Africa, it was found that participants that were younger, single, students or self-employed had different perceptions of what they want in a mobile phone. They looked at the size of the display, weight, design, overall quality, accessories, and appearance when they were picking a mobile phone. This shows that they prefer their mobile phones to look good, feel good and sometimes, be a statement about themselves, an extension of their personality. The authors also, in stark contrast, found that older or married people or even home executives mainly looked for ease of use and reliability when purchasing new smartphones. They clearly put convenience and functionality over looks, appearance and image. Zulu-speaking users favoured brand and subscription fee.

According to a study done by Safiek Mokhlis and Azizul Yadi Yaakop in Malaysia (2012), factors such as “media influence” and “image” were ranked in sixth and seventh in influencing buying behaviour of mobile phones, showing that they were not too important according to the participants.

According to Mesay Sata (2013), most of the participants said that they wanted to move away from the Nokia brand to Samsung, Apple and Blackberry. This was because Nokia was still making rudimentary phones whereas the other manufacturers were innovating. This is one of the examples of Nokia’s very well-known downfall in the mobile phone industry.

According to a study done by Muhammad Turki Alshurideh (2014), utilitarian reinforcements, behaviour setting and learning history affect the customer repetition behaviour positively, whereas utilitarian and informational punishment affects the repetition behaviour negatively. Behaviour Setting refers to the type of environment the customer is placed in, in order to increase the chance of an action being induced. Experience refers to the experience created by the factors in the Behaviour Setting. Utilitarian factors involve direct penalties or gains for the customer. Informational factors are the indirect factors that act as penalties/gains in the mind of the customer.

According to a study conducted by Azira Rahim, Siti Zaharah Safin, Law Kuan Kheng, Nurliyana Abas, Siti Meriam Ali (2015), it was also interesting to note that over 38% of participants owned 2 phones. And 4.4% of the participants owned more than 2 phones. There was also a big influence on purchase intention by social influence. It is also noted that social influence determines, to some extent, the participants’ dependency on a smartphone, how long they use smartphones for and what they use it for. However, it was found that product sacrifice did not have a significant outcome on purchase intention, as was hypothesised. However, over the last couple of years, the consumers have become more enlightened and are looking for better all-round smartphones and these sacrifices are being spotted more often, resulting in backlash on social media, forums, and conventional media too. This has caused brands to be more cautious as to where they cut costs and increase margins.

Based on these previous studies and the present environment, a sophisticated and thorough questionnaire has been created to perform this study and identify the factors influencing buying behaviour of mobile phones.

Table 1: Review of Literature

Sl. No.	Author(s)	Year	Key Findings
1.	T.S.H. Teo, Siau Heong Pok	2003	WAP-enabled devices were adopted quickly by tech-savvy, younger consumers, as compared to older and more conventional consumers.
2.	Heikki Karjaluoto, Jari Karvonen, Manne Kesti, Timo Koivumäki, Marjukka Manninen, Jukka Pakola, Annu Ristola, Jari Salo	2004	Participants bought phones primarily for phone calls and not much else. Price-sensitive and brand-sensitive – Nokia was well-known and trusted. Consumers were not too aware of new and modern technologies, nor did they care.
3.	Saowalak Uampranee	2006	Most consumers preferred brick-and-mortar physical stores. Features and performance were important, but smartphones were too expensive.
4.	Bishal Nagarkoti	2009	Younger and single participants were willing to spend more on smartphones compared to married and elderly. Participants found expensive mobile phones worth it for their innovations and features.
5.	Shashikumar Sharma	2010	Youth buyers were very influenced by brands they preferred. Mobile phones allowed people in Bhutan access to the internet and phone calls, in a hilly rural place. Warranties were very important factors.
6.	Mandusha Maharaj and Brijball Parumasur	2011	Older, married people looked for convenience, reliability and ease-of-use over appearance, brand image that the youth looked for. There was also great emphasis on network provider and fees.
7.	Safiek Mokhlis and Azizul Yadi Yaakop	2012	Media influence and brand image did not matter to majority of the participants. Recommendations ranked very high as a factor.
8.	Mesay Sata	2013	Most people still used Nokia, but most users wanted to shift to Samsung or other companies for their next phones. Durability was a major factor and after-sales service took a backseat.
9.	Muhammad Turki Alshurideh	2014	Physical setting, offers/discounts/promos and previous experience promoted repeat purchase

			behaviour whereas negative reviews, posts and overly priced products inhibited it.
10.	Azira Rahim, Siti Zaharah Safin, Law Kuan Kheng, Nurliyana Abas, Siti Meriam Ali	2015	Quite a few participants had 2 or more phones. It was also found that product sacrifices were not very drastic in terms of affecting buying behaviour or purchase decision.

Source: *Review of Literature*

### 3. Objectives of the Study

The following are the objectives of the study:

O1: To investigate the relationship between brand and buying behaviour towards mobile phones.

O2: To identify the relationship between specifications and features and buying behaviour towards mobile phones.

O3: To understand the relationship between value for money perceived and buying behaviour towards mobile phones.

O4: To explore the relationship between software and buying behaviour towards mobile phones.

### 4. Materials and Methods

The research study was conducted in Bangalore, India. The main objective of the study is to explore different factors influencing mobile phone purchase. Accordingly, the study focuses what factors result in a positive drive and what omissions/sacrifices cause the consumer to look at other mobile phone options. The sample for the study consists of 212 respondents aged between 16-24 and respondents were chosen using convenience sampling method.

This study uses both qualitative and quantitative data. Both types of data were obtained from primary sources. A self-administered and structured survey/questionnaire is shared with the participants and the respondents have contributed by providing primary data using both: open-ended and close-ended questions.

The content validity of the questionnaire was done by subject matter experts, industry experts and a statistician. This ensured that the questions were simple, clear and easy-to-understand. Descriptive statistics method of data analysis was used in the study. The data entry, compilation and analysis were done using Microsoft Excel.

### 5. Results and Discussion

The data analysis results for the Demographic Characteristics of Respondents is given in Table 2.

Table 2: Demographic Characteristics of Respondents

Item	Number of Respondents	Percentage
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<b>Gender:</b>		
Male	148	69.8%
Female	62	29.2%
Others	1	0.5%
Prefer Not to Say	1	0.5%
<b>Employment Status:</b>		
Student	121	57.1%
Employed	59	27.8%
Student, Employed	18	8.5%
Unemployed	8	3.8%
Freelance	6	2.8%
<b>Household Income:</b>		
INR 0-5 Lakhs	67	34.2%
INR 5-10 Lakhs	50	25.5%
INR 10-25 Lakhs	42	21.4%
>INR 25 Lakhs	37	18.9%

*Source: Data Analysis*

It is noticed from the chart and the table that there are more male respondents (69.8%) than female (29.2%) and there were 2 respondents that responded ‘other’ or wanted to remain anonymous (1%). It can also be seen that 57.8% (121) of the respondents are students, 27.8% (59) of them are employed, 8.5% (18) are employed while being students, 3.8% (8) are unemployed and the remaining 6 (2.8%) are self-employed/freelancers. This means that most of the respondents in this questionnaire were students, employed or otherwise. Most respondents (34.2%, 67) come from a household that has a total income of INR 0-5 Lakhs. This is followed by 25.5% (50) from households of INR 5-10 Lakhs of income which is followed closely by income of INR 10-25 Lakhs (21.4%, 42) and lastly, 18.9% (37) of respondents said that their household income is greater than INR 25 Lakhs.

Table 3: Brand of Current Mobile Phone

Brand	Number of Respondents	Percentage of Respondents
Apple	48	22.6%
Samsung	27	12.7%
OnePlus	36	17%
Xiaomi	40	18.9%
Motorola	3	1.4%
Others (Poco, Vivo, Oppo, Realme, etc.)	58	27.4%

*Source: Data Analysis*

It is found that Chinese phone brands take over this list by a large margin (everything except Apple and Samsung). Oppo, Vivo, Realme, OnePlus have over 58 (27.4%) respondents using their phones. Apple is also doing considerably well (48, 22.6%) despite their higher prices, followed by Xiaomi (40, 18.9%), OnePlus (36, 17%) and Samsung



(27, 12.7%). Motorola seems to be struggling in the market according to this study (3, 1.4%).

Table 4: “I use my desktop/laptop computer more than my phone”.

Category of Respondents	Number of Respondents	Percentage of Respondents
Strongly Agree	20	9.4%
Agree	28	13.2%
Neutral	84	39.6%
Disagree	57	26.9%
Strongly Disagree	23	10.8%

Source: Data Analysis

It can be seen from the above responses that most respondents (84, 39.6%) are neutral to this question which means that they use their laptop/desktop computers about as much as their phones. But interestingly: a total of 37.7% (80) of respondents either disagree or strongly disagree – which shows that nearly twice as many people use their phones more than their laptops/desktops as compared to people that use their laptops/desktops more than their phone (48, 22.6%). This shows how important phones are in our daily lives and how much they have taken over compared to sophisticated desktop computers. This will also be helpful to establish patterns later on in the chapter.

Table 5: Expenditure on New Phone

Budget	Number of Respondents	Percentage of Respondents
INR 0-10,000	8	3.8%
INR 10,000-20,000	73	34.4%
INR 20,000-40,000	76	35.8%
INR 40,000 and above	55	25.9%

Source: Data Analysis

It can be inferred is that most of the respondents prefer purchasing a phone that costs anywhere in the range of INR 10,000-40,000 (149, 70.2%). This is a far cry from only a few years ago when INR 40,000 was the highest amount of money someone would have to pay for a high-end mobile phone. This is also reflected in the measly number of responses for 0-10,000 as the preferred budget (8, 3.8%). Only a few years ago, phones like the Redmi 2 and the Lenovo Vibe K5 Note were trailblazing the market at prices under 10,000 for the highest spec versions. This goes to show why almost 26% (55) of respondents would go above INR 40,000 for a new phone.

Table 6: Primary Use for Mobile Phone

Primary Use Case	Number of Respondents	Percentage of Respondents
Work/College	80	37.7%
Gaming	15	7.1%
Content Consumption	47	22.2%
Social Media	54	25.5%

Creativity/Art	16	7.5%
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Source: Data Analysis

It can be seen from the graph above that most of the respondents (80, 37.7%) consider work/college as their primary use case for their phone. Content consumption such as movies, shows and music (47, 22.2%) and social media usage (54, 25.5%) have almost the same number of respondents. Gaming was the primary use case for only about 15 (7.1%) respondents.

In 2022, when almost every mobile phone manufacturer has gaming features as a priority on their releases or in some cases, even a sophisticated gaming model – it is interesting to see very few respondents here. Creativity and Art took a back seat (16, 7.5%) and it is understandable as there is only so much you can do on a mobile phone due to the lack of screen real estate, features, accessories, and flexibility.

Table 7: Build and Design Preferences

Category of Respondents	Number of Respondents	Percentage of Respondents
Premium Materials	94	44.3%
Plastic/Cheap Materials	7	3.3%
Not A Priority	11	5.2%
(Compact and Easy to Use)	100	47.2

Source: Data Analysis

Over 44% (94) of the respondents like to have premium materials such as glass and metal on their mobile phones. The largest chunk of respondents (100, 47.2%) preferred to have a phone that is compact and easy to wield and use, regardless of design. Function is more of a priority than form for them. A very small number of people (11, 5.2%) do not prioritise build and design of the phone and an even smaller number (7, 3.3%) think that plastic is the way to go. This shows that build and design is very important and a phone must not only feel premium, but also be sturdy and easy to use.

Table 8: Display (Screen) Preferences

Category of Respondent	Number of Respondents	Percentage of Respondents
High-Res + Great Colours	70	33%
Smooth + Performant	99	46.7%
Large Display	17	8%
Compact Display	8	3.8%
Not A Priority	18	8.5%

Source: Data Analysis

Given how popular AMOLED displays have become, it is surprising to note that more people (99, 46.7%) care about the smoothness and performance of a display as compared to the colours and resolution (70, 33%). This question was posed in this way because a lot of manufacturers, especially in the mid-range market (between INR 15,000-30,000) either offer an AMOLED display with lower refresh-rates, or an LCD display with high refresh-

rates. A smaller number of people (17, 8%) do not care about the display and just want a large sized display that covers the entire phone. The smallest number of people (8, 3.8%) would rather have a compact screen on a compact phone.

Table 9: Performance Preferences

Category of Respondents	Number of Respondents	Percentage of Respondents
Fastest And Latest SoC	109	51.4%
Efficiency Over Speed	65	30.7%
Software Optimisation	26	12.3%
Not A Priority	12	5.7%

Source: Data Analysis

Over 51% (109) of the respondents said that they want the latest, greatest and fastest SoC (System on Chip). 65 (30.7%) respondents said that they are okay with a more power-efficient chip that might not be the fastest around. Only 26 (12.3%) respondents said that they think software optimisation and the operating system is more crucial to performance than hardware is. This is due to the marketing by the manufacturers that always puts hardware first and software always took a backseat in years past. Only 12 (5.7%) people responded that performance is the least of their worries and their phone should just work.

Table 10: Battery Preferences

Category of Respondent	Number of Respondents	Percentage of Respondents
Large Battery – Slow Charge	116	54.7%
Smaller Battery – Fast Charge	69	32.5%
Not A Priority	27	12.7%

Source: Data Analysis

A longer lasting battery that does not charge too fast is what most respondents (116, 54.7%) prefer. However, just under 70 (32.5%) respondents said that they would prefer a smaller battery with quick charging. This might be more suited for people that keep traveling/commuting all day and do not have too much time to charge their phones. There are phones in the market that offer a choice between the above choices now (example – Realme GT Neo 3). A small portion (27, 12.7%) of respondents that said their usage is so light that battery life is not a concern for them.

Table 11: Camera Preferences

Category of Respondents	Number of Respondents	Percentage of Respondents
Most Megapixels	77	36.3%
Great Post-Processing	52	24.5%
Manual/RAW Mode	18	8.5%
Multiple Types of Cameras	25	11.8%
Front Camera Is Priority	3	1.4%

Not A Priority	37	17.5%
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*Source: Data Analysis*

An overwhelming number of respondents (77, 36.3%) said that they wanted the camera with the highest megapixel-count. 52 (24.5%) respondents said that they preferred to have great post-image processing via software, even if it is not as sharp as some of the higher resolution cameras. 37 (17.5%) respondents said that they barely use the cameras on their mobile phones and hence, it is not a priority for them. 25 (11.8%) respondents said that they liked having different options for cameras such as zoom, ultrawide, macro, etc. This is surprising because manufacturers in the market include as many cameras as they possibly can.

Table 12: Storage Options

Storage Options	Number of Respondents	Percentage of Respondents
64GB	17	8%
128GB	93	43.9%
256GB	68	32.1%
512GB And Above	27	12.7%
Slower Expandable Memory	7	3.3%

*Source: Data Analysis*

17 (8%) respondents said that 64GB would suffice for them on a new mobile phone. 93 (43.9%) respondents said that 128GB is the sweet spot. Around 68 (32.1%) respondents said that 256GB is necessary for them on a new mobile phone. 27 (12.7%) respondents said that 512GB and above is what they would need. Only 7 (3.3%) people responded saying that they would like to have expandable memory in the form of an SD Card slot.

Table 13: “I am someone that likes a colourful design”.

Category of Respondents	Number of Respondents	Percentage of Respondents
Strongly Agree	28	13.2%
Agree	62	29.2%
Neutral	85	40.1%
Disagree	26	12.3%
Strongly Disagree	11	5.2%

*Source: Data Analysis*

Most of the respondents (85, 40.1%) felt neutral about this statement. 90 respondents (42.4%) said that they agreed or strongly agreed to the statement posed. Only 37 respondents (17.5%) felt negatively about the statement posed.

Table 14: “I would like to switch brands for my next phone”.

Category of Respondents	Number of Respondents	Percentage of Respondents
Strongly Agree	30	14.2%
Agree	58	27.4%

Neutral	65	30.7%
Disagree	31	14.6%
Strongly Disagree	28	13.2%

Source: Data Analysis

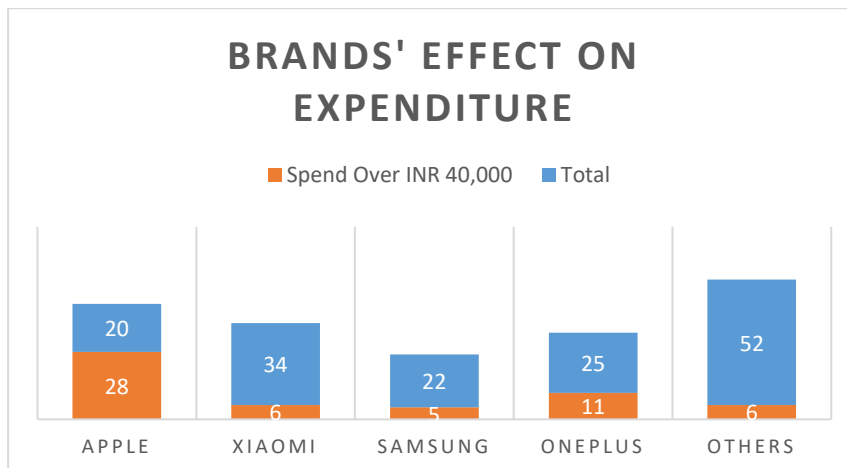
65 (30.7%) respondents feel neutral about this statement. 58 (27.4%) respondents agreed and would like to change to a different brand for their next smartphone. 30 (14.2%) respondents said they strongly agreed, which implies that they are unhappy with something about their current brand of smartphone and their experience has not been great. 31 (14.6%) respondents disagreed and said that they would prefer to go with the same brand of mobile phone as their current one. Only 28 (13.2%) strongly disagreed, showing their loyalty and satisfaction with their current mobile phone brand.

Inferences from Manual Qualitative Analysis:

Brands' Effect on Respondents' Preferred Budgets (RO1):

Apple, Xiaomi, Samsung, OnePlus and Others (Poco, Realme, Oppo, Vivo, etc.) were compared in order to find out if hypothesis 1 was true. The first test aimed to find out what effect the brand of the respondents' current mobile phone had on the amount of money they would prefer to spend on a new mobile phone. The results are as follows:

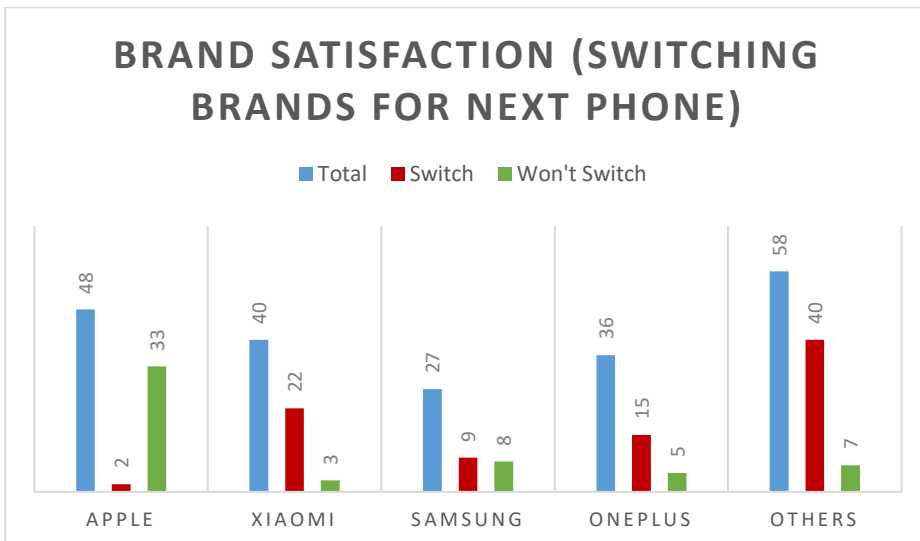
- Out of a total of 48 Apple (iPhone) users, 28 (58%) of them responded that they'd spend over INR 40,000 on a new mobile phone.
- Out of a total of 40 Xiaomi users, only 6 (15%) of them responded that they'd spend over INR 40,000 on a new mobile phone.
- Out of a total of 27 Samsung users, only 5 (18%) of them responded that they'd spend over INR 40,000 on a new mobile phone.
- Out of a total of 36 OnePlus users, 11 (30%) of them responded that they'd spend over INR 40,000 on a new mobile phone.
- Out of a total of 58 users of mobile phones from brands such as Oppo, Vivo, Realme, IQOO, etc. – only 6 (10%) respondents said that they'd spend over INR 40,000 on a new mobile phone.



Respondents' View on Switching Brands (RO1)

Another test that was done as part of the analysis on the effects of a brand on consumer buying behaviour was to find out how many respondents wanted to switch brands or stay loyal to their current brand since they were satisfied. The statement posed was – “I would like to switch brands for my next phone”. The results here, too, were very telling:

- Out of a total of 48 Apple (iPhone) users, 33 of them either disagreed or strongly disagreed to switching brands. Only 2 agreed.
- Out of a total of 40 Xiaomi users, 3 of them either disagreed or strongly disagreed to switching brands, whereas 22 of them agreed or strongly agreed.
- Out of a total of 27 Samsung users, 8 of them either disagreed or strongly disagreed to switching brands, and 9 of them agreed or strongly agreed.
- Out of a total of 36 OnePlus users, 5 of them either disagreed or strongly disagreed to switching brands, whereas 15 of them strongly agreed or agreed.
- Out of a total of 58 users of mobile phones from brands such as Oppo, Vivo, Realme, IQOO, etc. – 7 of them either disagreed or strongly disagreed, whereas 40 of them strongly agreed or agreed.



#### Effects on Features and Specifications Preferences(RO2):

- Out of the respondents that said content consumption is the primary use case for their phones – 28 of them responded that they’d like a performance oriented and smooth display – whereas, only 11 responded that they’d like a high-resolution and colourful display. This was very surprising as conventionally, the more colourful and sharper a display is – the better it is for movies, shows, cartoons, eBooks and the like.
- Out of the respondents that said that social media is their main use case for their mobile phones – only 7 of them responded that they do not care about cameras on their phones at all – whereas, 34 of them responded that they wanted either the greatest number of megapixels on their cameras or the best processing/colours. This shows that for people that are on social media all the time, posting pictures is a big part of that, hence the camera being so important.
- Out of the people that responded that creative activities (photography, art, graphic design, etc.) were their main use case on their phone – only 1 responded that they do not care about the cameras whereas the rest wanted RAW/Professional mode. Thus, it can be inferred that most of the respondents in this category do photography and would love to have a RAW/Manual/Professional mode on their camera applications.

- It was also noticed that every single respondent that said gaming was their primary use case – cared about the battery. Every other category of respondent was present except for the gamers. This shows that for most tasks, battery life on most phones is ample. This also shows us that gaming is the most power consuming activity on a mobile phone and that gamers prefer having a battery that is reliable, long lasting and fast charging.
- The last and the most important inference with regard to specifications and features is that the most “do not care/not a priority” answers amongst the five pillars of a smartphone (battery, camera, build/design, display, performance) came for battery and camera. What this tells us is that batteries and cameras have become so good over the years that no matter what mobile phone a consumer buys, the battery life and cameras will be useable at the least. The technology has come so far, that mobile phones that cost less than INR 10,000 today, have better cameras and battery technology than the highest-end phones from 7+ years ago. This shows clearly how far mobile phones have come and the other 3 pillars of mobile phones are catching up to the same level of advancement as batteries and cameras.

Effect of Budget on Consumers’ Expectations (RO3):

The whole dataset was filtered and divided into two categories. Respondents that were willing to spend INR 0-20,000 and respondents that were willing to spend INR 20,000 and above. Post this, the responses from both these categories were analysed to find differences in expectations and needs of respondents.

Table 15: Feature Priority Level According to Budget

Price Bracket =	INR 0-20,000		INR 20,000 and Above	
Feature/Answer	Not A Priority	Priority	Not A Priority	Priority
Build/Design	51	29	52	63
Display	21	60	22	109
Battery	14	67	13	118
Camera	18	63	19	112
Performance	35	46	42	89

Source: Data Analysis

- Build and Design - Build quality and design is clearly very important to a lot of respondents. However, it was noted that more respondents answered that they cared about a well-designed smartphone that was easy to use and fit well in the hand than a phone that incorporates premium materials all over it.
- Display, Camera and Battery - These three areas had very similar results wherein, they were clearly more of a priority in both budget brackets as compared to performance and build/design. This shows that the display is what is used to interact with a mobile phone, the battery needs to last long and the cameras have to be able to capture great memories.
- Performance - Performance took a backseat as a surprising number of respondents said that they cared about efficiency more than pure power. This is unsurprising especially considering how good less expensive modern mobile phone processors have become at being efficient and powerful.

It can be inferred from this test is that for the INR 0-20,000 price bracket – display, battery and camera are all very important and need to be competent whereas the performance is

almost guaranteed due to the availability of great chipsets. Build quality is not too much of a priority for consumers in this price bracket as premium materials are a very superficial feature and do not directly impact the use of a mobile phone. Adding to this, most people tend to use a protective case on their phone which renders the premium materials useless.

For the INR 20,000 and above price bracket too – display, battery and camera are all equally as important but build quality and performance do become more important when compared to the INR 0-20,000 price bracket, although still nowhere near as prioritised as display, camera and battery. This is due to the simple fact that these consumers are paying more money and the added benefits should come as better performance and much better build quality – with the use of metal and glass, precision manufacturing and great quality.

#### Effect of Software on Consumers (RO4):

The fourth hypothesis was proven by a set of analyses done on the data.

- Out of 26 respondents that cared about software and optimisation and found it to make the biggest difference in terms of performance – only 4 of them used Apple's phones. This is a surprise since Apple is the premier brand known for making iOS the most optimised and efficient Operating System in the industry. However, Google's vanilla Android is also very well optimised for their tensor chips and enthusiasts are generally the ones that prefer stock Android with no manufacturer modifications, and this may be why most of these respondents used phones with stock Android – i.e., Nokia, Motorola and Google Pixel.

- In the camera department, out of 25 respondents that mentioned that they would want professional/RAW mode in their camera applications – it was interesting to note that only 3 out of these 25 used Apple iPhones. On further research, Apple doesn't include the support for professional/manual mode on their phones. They don't even allow for RAW image capture. For people that want such customisability and freedom – Android will always be the way as Apple takes pride in optimising their software to such an extent that it may be restricting to some. Applications that are free on Android are paid on iOS, third party applications that are not on the iOS App Store cannot be downloaded unlike on Android, the phone's user experience cannot be customised to the extent that Android's can.

What can be inferred from this is that for consumers that want a simple user experience that works well and reliably, Apple is a very good choice – but for the consumers that want to customise their phones, the user experience, the apps, settings and tinker with their phones – Android is definitely the better option. In the quest for optimisation and speed, Apple's iOS is restrictive in what it allows users to do – and that can be a dealbreaker for many.

## 6. Findings, Suggestions and Conclusions

### 6.1 Findings:

- Many respondents still prefer buying mobile phones by visiting physical brick-and-mortar locations. This is presumably due to the confidence involved during purchase, a side-effect of being able to use the phone and feel it before selecting it.
- More than the brand name itself – the technological ecosystem that a brand creates around its customers is what seems to matter. Apple was the most favourable brand by a



runaway margin because of how well optimised its ecosystem and software is and also because of how difficult Apple makes it to step out of that ecosystem.

- The mid-range mobile phone market is the largest. Most respondents were willing to spend between INR 10,000 – 40,000 on a new mobile phone.
- Contrary to modern belief – a lot less respondents used their phone primarily for gaming than expected.
- Apple users and OnePlus users also seem to be willing to spend a lot more money on average as compared to users of Samsung, Motorola, Xiaomi, Vivo, Oppo, Realme, etc. This is presumably because OnePlus and Apple do not make any phones that are under INR 20,000 and so, most of their existing customers have already paid over INR 40,000 for their current mobile phones.
- It was found that features and specifications expected can be determined to some extent by the primary use case of a respondent – for their mobile phone. Respondents whose primary use is social media – prefer to have great cameras rather than not. Respondents who game a lot on their mobile phones – prefer to have great battery life/charging speeds and the best processor. Respondents that did photography wanted a RAW/Professional mode on their camera apps.
- It was also noted that consumers know when they are not spending a lot of money on a high-end mobile phone and expect features and specifications rationally. However, it was also noted that the most important features, even on a lower-end mobile phone are the display, camera, and the battery. On the higher end phones, too – these were the most important features but the performance and build quality was definitely more of a priority in the higher-end price bracket.
- Software plays a big role in the purchase of a mobile phone and buggy and unintuitive software will turn anyone away from a mobile phone that is great hardware-wise. Apple is known for their simplicity and optimisation of software and it shows in the fact that not too many of their customers even seem to care about software since they already know from experience that it will be a good experience.
- Lastly, it was also found that employment status of the respondent made a big difference to the amount of money they were willing to spend on a new mobile phone – and indirectly, their expectations from it as well.

## 6.2 Suggestions:

The following are some of the suggestions from the respondents (from 2 open-ended questions provided in the questionnaire):

- All brands apart from Apple have been unsuccessful in building an ecosystem of products. It is necessary for more brands to come forward and build product ecosystems, at competitive prices in order to compete.
- Software updates and support must be extended on mobile phones to at least 3 years for the lowest-end phones. Higher-end models must receive over 5 years of software updates as people plan on using these mobile phones for longer.
- Manufacturers should shift their resources and interests from making software features for gaming that barely anybody uses (including gamers) to optimising their software overall, enabling better post-processing in photos and providing fast and bug-free software updates.

- Brands must try as much as possible to keep the modifications to Android OS to a minimum. Stock Android is clearly favoured by most.
- A lot of respondents, when asked “what is the one uncommon feature in mobile phones you think should be a necessity?”, answered – the headphone jack. This has been a trend that Apple started and the 3.5mm Analog Audio jack has been removed from a lot of mobile phones. Clearly, the general public want it present. Two other answers seen a lot were “IR Blaster” and “removable battery”, both of which were present more often in the recent past. Xiaomi still offers IR blasters in most of their phones but the removable battery is gone for good, it seems.
- When asked “what common feature do you think is unnecessary?” – most respondents said the existence of multiple cameras. This opinion is very widespread, even on forums and social media online. Manufacturers must stop installing 4 or more cameras on the back that are all mediocre and instead focus on one or two really good camera sensors – which is what the consumers would appreciate more. Example – Google Pixel Series.

### **6.3 Conclusion**

It can be concluded that there are numerous factors that play a role in consumer buying behaviour of mobile phones. Some of them were unearthed in this study – like employment status, total household income, brand, features, and specifications (camera, battery, display, build and design and performance), value for money, software, etc. It is extremely difficult to manufacture a perfect mobile phone that has the best of all these worlds – which is why manufacturing and making a good mobile phone is about picking the right set of compromises. Focusing on what is important and what the customers really want and only then coming to the rest of the additional features. Conducting surveys and sending out questionnaire at any point in time can allow for a brand to understand what these “wants” are and prioritise them.

Good communication is imperative for a brand to succeed – but implementing the learnings from the communication is also imperative. Getting the basic hardware features right, then wrapping it all up with great software and a good software update schedule and ecosystem is a great formula for a great mobile phone, in 2022.

### **7. Scope for Future Studies**

Preferences change and so does the technological environment. As mentioned in Chapter 1 – the mobile phone industry is growing exponentially year-on-year and there are all kinds of new and experimental technologies debuting in the market. Folding screens with “ultra-thin glass”, cameras under the display, fingerprint scanners under the display, dot-emitters to scan a face for biometric authentication – all these features are game changing and will be even more widespread in the coming years. Future researchers can delve deeper into the topic if there are no time restraints that disallow it, and can even do research on a geographic that is larger than and/or different from Bangalore.

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# Traffic Sign Detection Using CNN

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## **Abstract:**

*In this paper, we will build a deep neural network model that can classify traffic signs present in the image into different categories.*

*The dataset contains more than 55,000 images of different traffic signs. It consists of 43 different classes of Traffic Sign Classification*

*And is very useful in Automatic Driver Assistance Systems. A convolutional neural network is a class of deep learning networks, used*

*to examine and check visual imagery. Our approach to building this traffic sign classification model is discussed in four steps 1. Explore the dataset, 2. Build a CNN model, 3. Train and validate the model, 4. Test the model with the test dataset. We use KerasCNN for this detection. Convolutional Neural Network (CNN) architecture consists of 45 convolutional layers, 45 batch normalization, flattening the image, and a Dense of hidden and output layers.*

**Keywords:** Convolutional Neural Network, Traffic Sign Classification, Real-time traffic Sign Recognition.

## **INTRODUCTION**

Machine learning algorithms have gained importance nowadays. Spam filtering, speech understanding, face recognition, and road sign detection are only a few examples where machine learning is deployed. In traffic zones, Traffic Sign Recognition and classification can be used to automatically identify traffic signs. This is done automatically by the system as the traffic sign is detected and the sign name is displayed. So, even if any sign is missed by the driver or has any lapse in concentration, it will be detected. This helps to accordingly warn the drivers and forbid certain actions like speeding. It also disburdens the driver and hence, increases his/her comfort. Thus, ensuring and keeping a check on the traffic signs and accordingly following them. Traffic signs, indeed, provide us with a multitude of information and guide us accordingly so that we can move safely. Traffic Sign Classification is very useful in Automatic Driver Assistance Systems.

A convolutional neural network is a class of deep learning networks, used to examine and check visual imagery. It is used to train the image classification and recognition model because of its high accuracy and precision.

## **LITERATURE REVIEW**

In today's world, the identification of traffic signs has become an important aspect of our lives. Looking at the increasing traffic, to ensure the safety of all and for automatic driving in the future, traffic sign classification is of utmost necessity. Considerable research has been done on the recognition of traffic and road signs.

In [1], the author has reviewed the traffic sign detection methods and divided them into 3 types of methods: color, shape, and learning-based methods.

In [2], the author used the number of peaks algorithm to detect and recognize circular-shaped traffic signs.

In [3], the authors have tried creating a classification model using the Enhanced LeNet-5 architecture, which consists of two consecutive convolution layers (before the MaxPooling layer) to extract high-level features from the image. Also, they have used the data augmentation technique to make the dataset stable.

In [4], the authors have used the technique of color segmentation and RGB-based detection which is used to identify the traffic signs on the road. The optimizer used was “Stochastic Gradient Descent” with Nesterov Momentum. The text-to-speech system was implemented to alert the driver about the traffic sign. Also, they utilized the GPU (graphical processing unit) system, as part of the hardware.

In [5], the authors have tried generating a dataset for the Arabic Road signs and thus develop a CNN model for Arabic sign recognition.

## METHODOLOGY

Traffic Sign Classification is one of those rare topics of discussion. Most of the existing systems focus on detection only. Detection is mainly the extraction of features and finding out the important coordinates in the image. Classification is the categorization of images into different classes.

The most common dataset used for the purpose is GTSRB which consists of 43 classes. In the proposed system, a prediction model is trained using this dataset. It performs best for image classification. Lately, Convolutional Neural Network has been adopted in object recognition for their high accuracy and less computational cost.

In the proposed system, the primary focus is on the traffic sign classification which also prints the traffic sign name once the detection of the image is done. There is a CSV file that consists of the pairs of traffic sign names and the class ID. This file helps to load the labeled data.

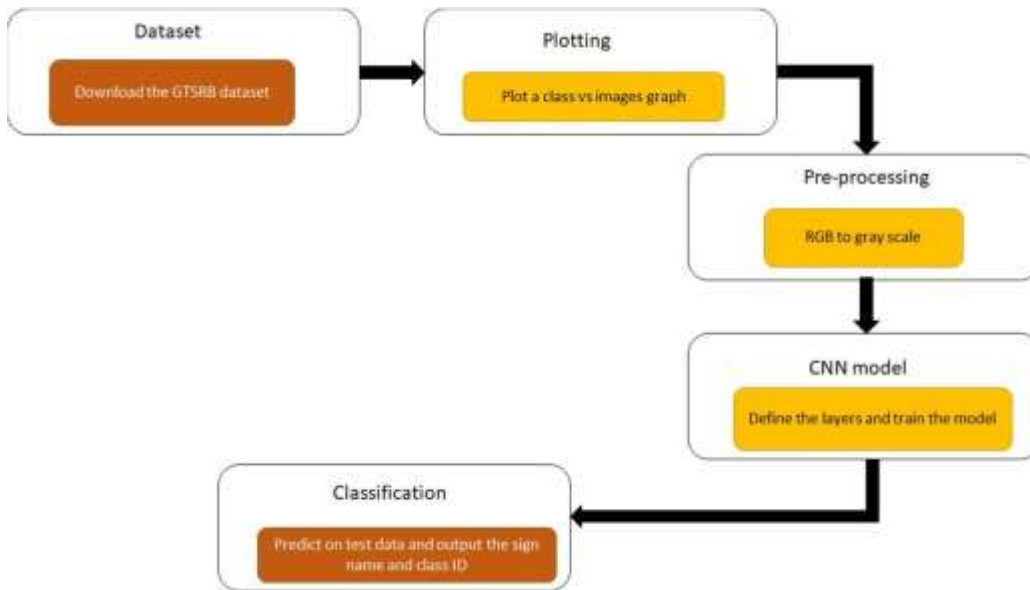
### A. *Gray Scale*

Converting the RGB data set into a grayscale is one of the important steps before classification using CNN. This has several advantages:

- 1) Images after converting to grayscale, help the neural network to process them easily as the unwanted biases are removed.
- 2) Gray scaling the images helps to reduce the number of computations, as the number of channels will get reduced after conversion.
- 3) This in turn helps to improve the model’s accuracy.

Before gray scaling, the image data shape (of the training data set) is: (39209, 32, 32, 3). This means that the images were of 32x32 size and colored in RGB format (3 channels).

After gray scaling, the image data shape (of the training data set) becomes: (39209, 32, 32, 1). After gray scaling the size of the image remains the same (32x32) but the number of channels is reduced to 1.



## RESULTS AND DISCUSSIONS

Traffic sign classification is the process of automatically recognizing traffic signs (like speed limit, yield, and caution signs, etc.) and accordingly classifying them as to which class they belong. The project has two main functionalities: Prediction on the newly generated dataset and live webcam traffic sign detection.

Accuracy is the ratio of several correct predictions to the number of total predictions (Eqn. 1). Accuracy = (The Number of Correct Predictions) / (Total predictions).

### A. Equation 1: Formula for accuracy

The accuracy achieved on the test dataset is 93%. The accuracy of the GTSRB dataset and the built dataset are shown in Table II.

Table II Accuracy Statistics

Sr No.	Dataset used	Accuracy
1.	GTSRB	98%
2.	Generated dataset	75%

Loss, accuracy, val\_loss, and val\_accuracy

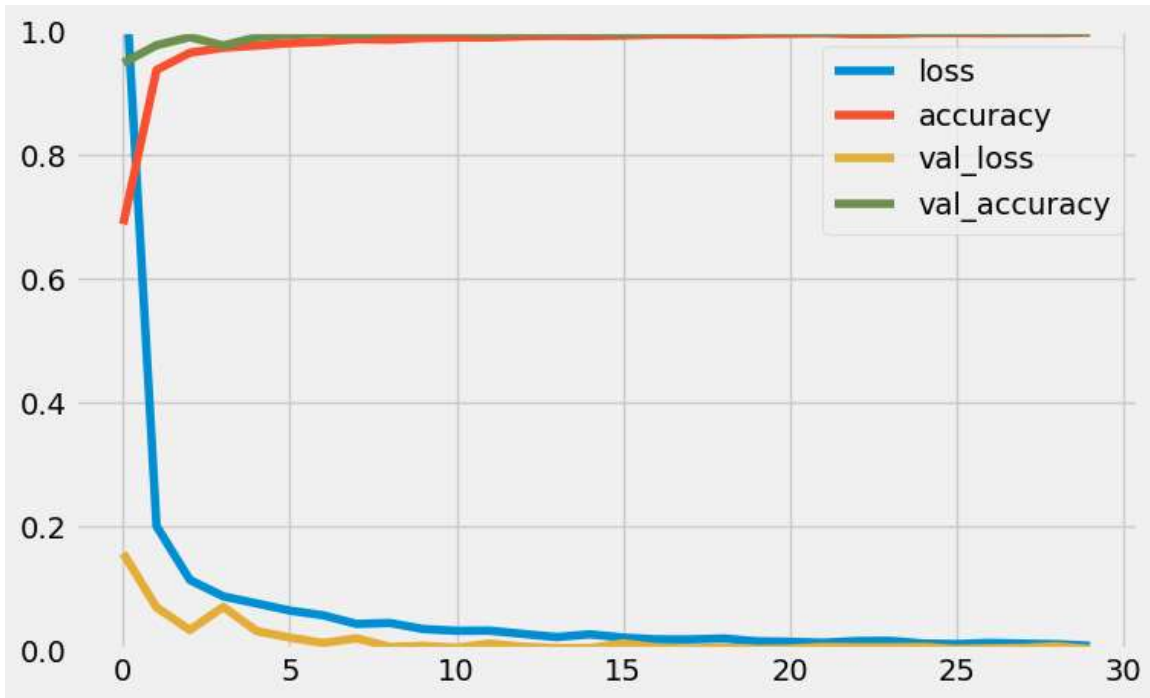


Table III

Loss Statistics After 30 Epochs

Sr No.	Dataset	Loss
1.	Training Loss	0.0071
2.	Validation Loss	0.0019
3.	Training Accuracy	0.9979
4.	Validation Accuracy	0.9994

### LIMITATIONS

Although there are many advantages of traffic sign classification, there are certain difficulties as well. The traffic sign may be hidden behind the trees or any board on the roadside which may cause inaccurate detection and classification of the traffic sign. Sometimes it may happen that the vehicle went so fast, that it did not detect the traffic sign. This may be dangerous and can lead to accidents. There is a need for further research to deal with these issues

### FUTURE SCOPE

Traffic Signs are useful to all individuals who are driving a vehicle on the road. Traffic Signs guide drivers for following all the traffic rules and avoid any disruption to pedestrians. The environmental constraints including lighting, shadow, distance (sign is



quite far), air pollution, weather conditions in addition to motion blur, and vehicle vibration which are common in any real-time system may affect the detection and thus the classification. Hence, there is a need for further research and advancements to deal with these issues. Also, certain traffic signs may not be predicted accurately. For this, augmentation and one hot encoding techniques can be used. Augmentation involves shifting the image, zooming in, and rotating the images (if required).

This system helps the driver to observe the sign close to his / her eyes on the screen. This saves time and effort in manually checking whether any traffic sign board is there, identifying what type of sign it is, and acting accordingly. Traffic Sign Classification, thus, has a wide application in building smarter cars like automatic driving cars, where the system automatically detects, recognizes a traffic sign, and displays it.

## CONCLUSION

The proposed system is simple and does the classification quite accurately on the GTSRB dataset as well as the newly generated one (consisting of truly existing images of all types), and finally, the model can successfully capture images and predict them accurately even if the background of the image is not much clear.

The proposed system uses Convolutional Neural Network (CNN) to train the model. The images are pre-processed, and histogram equalization is done to enhance the image contrast. The final accuracy on the test dataset is 98% and on the built dataset is 75%. The webcam predictions done by the model are also accurate and take very less time.

The benefits of the “Traffic Sign classification and detection system” are generally focused on driver convenience. Despite the advantages of traffic sign classification, there are drawbacks. There can be times when the traffic signs are covered or not visible clearly. This can be dangerous as the driver won’t be able to keep a check on his vehicle’s speed and can lead to accidents, endangering other motorists or pedestrians, demanding further research.

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# Morphing Attacks Detection

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## **ABSTRACT**

*Image morphing has been the subject of much attention in recent years. It has proven to be a powerful visual effects tool in film and television, depicting the fluid transformation of one digital image into another. The growth of this field describes recent advances in image morphing in terms of Morphing attacks. Morphing attacks is a threat to biometric systems where the biometric reference in an identity document can be altered. This form of attack presents an important issue in applications relying on identity documents such as border security or access control. Research in face morphing attack detection is developing rapidly, however very few datasets with several forms of attacks are publicly available. This paper bridges this gap by providing a new dataset with four different types of morphing attacks.*

## **KEYWORDS**

Machine Learning, Deep learning, MTCNN, Face-Net, SSIM, SVM

## **INTRODUCTION**

In this study, a unique and diverse morphed database is created manually using professional software. Morphed images created from two and three subjects are included in this work. A modern morph detection model based on deep learning-based feature extractor and a machine learning based classifier is adopted to be trained and tested on the created database. Availability of image manipulation technology has also enabled the culprits to use this technology for fraudulent activities. In order to gain legal entry permission into foreign countries for unlawful activities many criminals are utilizing a technology called face morphing to trick the face recognition system. Image morphing has been around since 1980s but now with the ease and abundance in availability of software and hardware technology to the general public, creating morphed images for fraudulent activities is easier than ever. In face morphing technology the image of two or more persons can be combined or merged together in such a way that it resembles the participants of the morphed image and the facial recognition system approves the morphed image as the original image of the applicant.

## **PROPOSED METHODOLOGY**

### **MORPH ATTACK DETECTION MODEL DESIGN**

#### † **FACE EXTRACTION**

- Extraction of faces from input images (morph and live captured) using MTCNN. Extracted images are converted to size of 160 160 3 for FaceNet
- Features are extracted from the input images using FaceNet.

#### † **MTCNN**

- The main morph attack detection model is implementations of MTCNN (Multi task cascaded convolutional neural networks) and cosine distance calculation.
- This model is based on DeepFace model FaceNet (a pre-built deep learning neural network) and it is used for training and testing during this study.

#### † **Feature combination**

- Features from input live captured and potential morph image are combined using subtraction, addition, or concatenation.
- Features of potential morph and its respective live captured image are combined after verification from the facial recognition system based on structural similarity index measure (SSIM) and cosine distance.

#### † **Feature combination**

- The combined features are forwarded to the machine learning based classifier SVM (support vector machine) for classification of input images as morphed or original images.

### PREVIOUS METHODOLOGIES

#### † **IMAGE MORPHING**

- Different techniques of morphing like **mesh warping**, **field morphing** and **radial basis morphing** have been used for creation of morphed faces.
- In mesh warping, meshes are **used to link** different **landmarks** or control points on the images of two subjects.

#### † **IMAGE MORPHING ATTACKS DETECTION**

- There are two basic types of morph attack detection (MAD) methods that are prevalent in the literature.
  - (a) Single image MAD method
  - (b) Double image MAD method

#### † **SOTA RESEARCH WORK**

- SOTA – state of the art recognition systems consists of VGG-Face, OpenCV, FaceNet, ARC-Face neural networks and is used in most of the latest morphing attacks studies however it is considered to be less accurate.

## EXPERIMENTS AND RESULTS

### ❖ ACCURACY

Training on 7 databases	Test database (Tool)	Accuracy %	APCER %	BPCER %	APCER-10 %	BPCER-10 %	ACER %	DEER %
FaceMorpher FantaMorph FotoMorph	FERET (FaceMorpher)	91.8	<b>24.2</b>	2.2	14.6	15.9	13.2	12.1
FaceMorpher FantaMorph FotoMorph	FERET (OpenCV)	91.6	25.1	2.2	14.2	22.1	13.7	12.5
OpenCV FantaMorph FotoMorph	FERET (FaceMorpher)	91.7	<b>24.4</b>	2.4	13.6	16.5	13.4	12.3
OpenCV FantaMorph FotoMorph	FERET (OpenCV)	91.5	25.1	2.4	14.4	21.2	13.8	12.5

S

It is evident from the results that a single database created from a single morphing tool is not sufficient for a practical morph attack detection model. The training database must contain a vast range and variety of images and morphing tools in order for a morph attack detection model to be able to learn distinguishing features from the source database

## CONCLUSION

The paper presents an extensive vulnerability assessment of the state-of-the-art face recognition systems based on VGG-Face, Arc-Face, and Face-Net neural network models on three image databases. The experiments demonstrate that a more accurate face recognition system Face-Net that is SOTA is more vulnerable to the morphing attack and is less accurate. Some of the methods like feature concatenation provided better morph attack detection performance but with the increase of computational cost. Similarly, it was observed that manually created morphed images with high quality morphing tools were difficult to detect by the models that were trained on morphed databases that had low variation and were made automatically from low quality morphing tools like OpenCV and Face\_Morpher using programming scripts. Testing of morphed images was also done using different machine learning based classifiers and SVM produced the best results.

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# A Study on Digitalization of Gold Purchase Through Gold Savings Schemes and Its Impact on Customers Preference in Dakshina Kannada District

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## **ABSTRACT**

*Digitization of the entire global gold system is going to be the demand driver for gold in the next few years says David Tait, Global CEO, World Gold Council. The industry is on the cusp of a digital revolution. Past research analysis shows that gold has historically rallied in periods of high inflation in India. Higher inflation and rising bond yield could drive investors towards gold and the average institutional and retail investor could benefit from an allocation to gold in the scenario of higher inflation and rising rates. Digitalization has paved the way for Digital Gold which can be purchased through various apps in denominations starting from 1 gram onwards. They are Gold ETFs, Gold Mutual Funds and Sovereign Gold Bonds. These forms of gold are lucrative and fetch an average of 10% risk free return on investment with extensive liquidity and no tax burden. Financial analysts prove that Gold has on average provided annual returns of 9.6% over the past 40 years, and during that period, only 8 instances of negative annual returns were recorded. Apart from the returns offered by Gold, another key reason for using it is as a hedge. This is based on the fact that it has historically shown lower volatility than equity investments over the long term. In fact, in many cases, it has shown an inverse correlation to equities, i.e., returns of Gold have historically been high when equity markets have witnessed a downturn. However, in the mind of the Indian customer, gold in the ornament form carries a lot of social, religious and emotional significance and is not perceived so much as a financial asset made out of savings. Irrespective of gender, the Indian consumer perceives gold as a personal possession and attaches a sentimental value which is much more than the value attached to any other financial asset. Possession of gold in ornament form and use on special occasions is predominant in the mind of majority of Indians and not many invest in gold with the intention of selling it at a future date to book profits arising on the appreciation of the capital asset. Another prominent development in the gold purchase habits of customers is the impact of digitalization and purchase*

*through various gold schemes. Corporate retail industry has cashed in on the popularity of Gold Schemes which have made gold purchase through installments even more convenient through digitalization. Though a customer has various options for buying gold in different forms, the preferred form of gold is of ornaments. This study evaluates the impact of digitization on customers' demand for gold ornaments and other forms of gold. Through data collected from 254 respondents in Dakshina Kannada district, it critically analyses the extent to which ornaments are preferred over other forms of gold. It also analyses the popularity of branded jewellery and the extent to which there has been a shift in demand towards main reasons for buying and holding gold by customers and the impact of various factors that motivate customers to purchase and hold gold.*

**KEY WORDS:** DIGITAL GOLD, GOLD SCHEMES, FINANCIAL ASSETS, CUSTOMER PERCEPTION

## **INTRODUCTION**

From times past gold has been traditionally viewed as a safe bet for investments and is referred to as the strategic asset or a safe-haven asset because of its historical proven reliability and durability during times of uncertain and volatile economic conditions. (Deloitte.com). For thousands of years gold has been used as money and a means of exchange and right from the early days, it has been the dominant currency and still plays a predominant role in the international monetary system till 1971 when the international monetary system collapsed with the Bretton Woods. Not surprisingly, the recent upheavals in the global economy caused by covid-19 have reiterated the fact that gold is still the safe-haven investible asset. As a commodity, gold has proved to be extremely resilient and has not seen a loss in value nor have its returns reduced in the short and the long run. It has been stated in the findings of The World Gold Council (WGC) that there has been a progressive growth in the demand for gold worldwide since 2001 and on an average, the average growth rate in investment demand for gold is 15% per year. The main growth drivers for this increase is the arrival of novel ways to invest in the gold market through products such as physical gold, gold backed, exchange traded funds (ETFs) and also by the sudden enlargement in the customer base expanding to the middle class in Asia and as an aftermath of the financial crisis in 2008-09 in the US and Europe, a renewed commitment to effective risk management. Intrinsically, long term returns, high liquidity, portfolio diversification and risk mitigating characteristics have made gold investment a very important asset class. As a result gold investment products are highly attractive to both retail and institutional investors locally and internationally.

Another prominent development in the gold purchase habits of customers is the impact of digitalization and purchase through various gold schemes. Corporate retail industry has cashed in on the popularity of Gold Schemes which have made gold purchase through instalments even more convenient through digitalization. Though a customer has various options for buying gold in different forms, the preferred form of gold is of ornaments. This study evaluates the factors that make gold as a preferred investment choice among customers and critically analyses the main reasons for buying and holding gold by customers and the overplay of various factors that motivate customers to purchase and hold gold.

## **II REVIEW OF LITERATURE**

1.	Influence of Digitization	The researchers highlight the various marketing efforts made by Tanishq, one of the top jewellery brands in the Indian market and emphasize the ways in which this Company has used technology for diversification of products and make the shopping experience for customers as unique and memorable as possible. Top branded jewellery shops in India have spared no efforts to enhance the aesthetic quality of the gold shopping experience in their showrooms. They have used digital technology in eliminating paper in monthly gold scheme purchases and have augmented sales by developing their marketing mix.	Bindu Tiwari & Dr Naveen Kumar
2.	Branded jewellery	According to this research study findings on the branded jewellery market in India, Tanishq has been ranked as the top most brands. They also found that customers know the benefits of investment in gold and are highly conscious of the benefits of purchasing gold of high carat value. Focusing on the businesses of traditional gold jewellery shops, this study found that branded jewellery shops have slowly but surely taken over the jewellery industry. This shows positive future of branded jewels.	Sumit G. Khadekar, Manish T. Wanjari & Ramesh R. Kohad(2016),
3.	Indian Gold Demand and Consumer Buying Pattern	India has been a leading consumer of gold in the world (WGC, 2016). Owing to the fact that it does not produce much, imports meet the demand for gold in India. In the year 2013, in order to curb the increasing demand of gold and reducing imports, the Government of India initiated some remedial measures. Consequently, gold imports declined and there has been downtrend since the year 2013. Demand for gold comprises mainly jewellery and investment product demands in India. So, the decrease in demand is visible in both jewellery and investment segments but the latter has declined more than the former. Based primary as well as secondary data analysis of investment products, and industry experience of the MMTC Limited, a dominant player in the gold market, this study analysed the demand for gold by retail consumers in India post 2013. It discusses the issues affecting retail consumers demand as well and reported changes in the consumer buying pattern with regard to precious metals like gold and silver.	Vaibhav Aggarwal Manager, MMTC Ltd. (WG 2016)



4.	Gold is the oldest form of storing wealth	Gold has always been the most important ways to store wealth from time immemorial. In this study, the researchers reported that goldsmiths in Sumeria in 3000 BC were already involved with gold working of different forms of jewellery which are still used today. They report that excavations in the royal cemetery of Ur, founded in 2500 BC revealed that gold had been a store of wealth for quite some time already and it was being utilized as money. Gold has had an impact on the everyday economic activities of ordinary people since at least Egypt in 1400 BC, where it was used as a monetary standard and the practice continues as gold continues to be famously used as money under various gold standards.	Fergal A. O'Connor, Brian M Lucey, Jonathan A. Batten & Dirk G. Baur (2015)
5.	Effect of Demonetisation on gold demand	In India, by far the most impacting move of the government towards digitization that affected the entire economy was the demonetization announced by the GOI on 8 <sup>th</sup> November 2016. The invalidification of tender currency of INR 500 and INR 1000 denominations and they ceased to be the legal tender with immediate effect. This measure which was taken as an attempt to address the issues like black money and counterfeiting notes paved the way to common man migrating to digital payment systems (Policy View, Care Ratings, 2016). Various digital payment channels were advised by the Government during this period to facilitate transactions. BHIM UPI and Aadhaar Pay were introduced to carry out the transactions not only from smartphones but basic feature phones as well.	Vaibhav Aggarwal MMTCLtd (2018)

### III STATEMENT OF THE PROBLEM

Demand for gold comprises mainly jewellery and customers hold gold in ornament form as investment product demands in India. It was found by various studies in 2013, that gold in Indian households amount to 16,000 tons and were predominantly held in the form of jewellery. The quantity has now increased by 50% and presently the World Gold Council has found that Indians hold a record 23,000 – 24,000 tons of gold worth \$800 billion (Approximately Rs.54.51 lakh crore). This makes Indian households the world's largest hoarders of gold. Though there are various alternatives available for investment in gold through options like jewellery, coins, bullions, ETF, mutual funds, E-gold etc, ornament form tops the list. Digitalization has impacted every common man and woman's investment and banking habits. It is necessary to see the impact it has had on gold purchasing habits of customers.

### IV OBJECTIVES OF THE STUDY

1. To analyse the impact of digitalization of gold purchase on the quantum and frequency of gold purchases by customers.
2. To evaluate the extent to which digital payment systems of organised gold showrooms have caused customers to prefer them over indigenous gold smiths.

## **V SCOPE OF THE STUDY**

This study is restricted to Dakshina Kannada and Udupi Districts in Karnataka only. Data was collected from the cities of Mangalore and Udupi and semi urban areas of Moodbidri, Karkala and surrounding areas in the State of Karnataka.

## **VI HYPOTHESES FOR THE STUDY**

1. Customers preference for gold is predominantly in ornament form.
2. Digitalization has modified payment systems for gold purchase to a minimum extent.
3. Digitalization has not affected customers' preference for gold purchase online.

## **VII RESEARCH METHODOLOGY**

The data for the research was collected by using Primary and Secondary data. Primary data was collected by distributing questionnaires and through interview method.

### **Sampling Plan**

The study is predominantly based on primary data collected through Questionnaire method. Data was collected from 254 respondents from the cities of Mangaluru and Udupi Districts and the semi-urban areas of Moodbidri, Karkala and surrounding taluks. The population which is indeterminate consists of gold purchasers of different age groups. Sampling technique employed is the purposive random sampling technique where respondents were selected on the basis of their gold purchasing habits.

This study has drawn heavily on secondary data was collecting data from various sources like MMTC, World Gold Council, Gold Hub, government websites, journals, magazines, and e- journals.

## **VIII STATISTICAL TECHNIQUES USED**

The data collected was analysed through various sophisticated techniques. The following statistical tests were run on the data and the results found and inferences drawn.

- Fisher's Exact Test or Chi Square test
- Wilcoxon Sign Test
- Wilcoxon Signed Ranks Test
- Paired Sample T-test

## **IX DATA ANALYSIS AND FINDINGS**

The data was collected from 254 respondents and was analysed through various sophisticated techniques. The following statistical tests were run on the data and the results found and inferences drawn.

- Fisher's Exact Test or Chi Square test
- Wilcoxon Sign Test
- Wilcoxon Signed Ranks Test

- Paired Sample T-test
- Correlation Analysis

### Fisher's Exact Test or Chi Square test

To analyse the association of some of the Socio-demographic factors and customers' gold buying behaviour the following Fisher's Exact Test or Chi square Test is performed

#### 1. Respondents Exposure to gold buying behaviour based on the demographic factors

**Hypothesis: There is no significant association between the factors related Frequency of buying gold, Form of purchasing gold and demographic factors of the students**

Below tables reveals the various personal factors calculated Fisher's Exact Test value or Chi square test value and their significance on respondents

**Table 1 Factors related Frequency of buying gold, Form of purchasing gold and demographic factors of the students**

	Fisher's Exact Test Value (FETV) and significant value ( p value)			
	Frequency of buying gold		Form of purchasing gold	
Age	FETV=19.221	P=0.235> 0.05 (NS)	FETV=29.262	P=0.208> 0.05 (NS)
Gender	FETV=2.555	P=0.636> 0.05 (NS)	FETV=3.772	P=0.717> 0.05 (NS)
Income	FETV=69.325**	P=0.000< 0.01 (S)	FETV=68.883**	P=0.000< 0.01 (S)
Education	FETV=30.907	P=0.073> 0.05 (NS)	FETV=54.771**	P=0.000< 0.01 (S)
Marital status	FETV=14.131	P=0.253> 0.05 (NS)	FETV=24.560	P=0.128> 0.05 (NS)
Place of residence	FETV=10.357	P=0.197> 0.05 (NS)	FETV=11.644	P=0.416> 0.05 (NS)

Occupation	FETV=30.618	P=0.300> 0.05 (NS)	FETV=68.392**	P=0.000< 0.01 (S)
Religion	FETV=9.443	P=0.748> 0.05 (NS)	FETV=25.828	P=0.123> 0.05 (NS)

(Sources: Source: Primary Data Survey)

\* Significant at 5% l.o.s

\*\* Significant at 1% l.o.s

### Frequency of buying gold

It is observed from the table above that among the selected personal factors of the respondents only income is significantly associated with the **Frequency of buying gold** at 1% level of significance as the p value is less than 0.01 .Hence the null hypothesis is rejected for the personal factor income of the respondents . There is significant association between income and **Frequency of buying gold**. Hence the **Frequency of buying gold** is completely dependent on the income of the respondents

### Form of purchasing gold

It is observed from the table above that among the selected personal factors of the respondents only income , education and occupation are significantly associated with the **Form of purchasing gold** at 1% level of significance as the p values are less than 0.01 .Hence the null hypothesis is rejected for the personal factors income, education and occupation of the respondents . There is a significant association between the income education and occupation and **Form of purchasing gold**. Hence the **Form of purchasing gold** is completely dependent on the income , education and occupation of the respondents

**Hypothesis: There is no significant association between the factors related to time of purchase and demographic factors of the respondents**

**Table 2: Factors related to time of purchase and demographic factors of the respondents**

Fisher's Exact Test Value (FETV) and significant value ( p value)		
	Time of purchase	
Age	FETV=23.658	P=0.475> 0.05 (NS)
Gender	FETV=8.990	P=0.153> 0.05 (NS)
Income	FETV=30.344	P=0.898> 0.05 (NS)
Education	FETV=39.618	P=0.163> 0.05 (NS)

Marital status	FETV=24.306	P=0.064> 0.05 (NS)
Place of residence	FETV=7.528	P=0.826> 0.05 (NS)
Occupation	FETV=44.061	P=0.291> 0.05 (NS)
Religion	FETV=38.882**	P=0.000< 0.01 (S)

(Source: Primary Data Survey)

\* Significant at 5% l.o.s

\*\* Significant at 1% l.o.s

### Time of purchase of gold

It is observed from the table above that among the selected personal factors of the respondents only religion is significantly associated with the **Time of purchase of gold** at 1% level of significance as the p value is less than 0.01. Hence the null hypothesis is rejected for the factor religion of the respondents. There is significant association between the religion and **Time of purchase of gold**. Hence the **Time of purchase of gold** is completely dependent on the religion of the respondents

### Wilcoxon Sign Test

As the observations are deviated from Normal distribution NonParametric Test - Wilcoxon sign test is used to find the impact of digitalization on gold purchase

**Hypothesis: There is no significant difference in the quantity of gold purchased before and after digitalization**

**Table 3: Difference in the quantity of gold purchased before and after digitalization**

### Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Quantity of gold purchased before digitalization	254	1.73	.824	1	5
Quantity of gold purchased after digitalization.	254	1.91	.876	1	5

(Source: Primary Data Survey)

**Table 4: Difference in the quantity of gold purchased before and after digitalization (Ranks)**

### Ranks

	N	Mean Rank	Sum of Ranks
Negative Ranks	34 <sup>a</sup>	56.03	1905.00

Quantity of gold purchased after digitalization.	Positive Ranks	74 <sup>b</sup>	53.80	3981.00
Quantity of gold purchased before digitalization	Ties	146 <sup>c</sup>		
	Total	254		

(Source: Primary Data Survey)

- a. Quantity of gold purchased after digitalization. < Quantity of gold purchased before digitalization
- b. Quantity of gold purchased after digitalization. > Quantity of gold purchased before digitalization
- c. Quantity of gold purchased after digitalization. = Quantity of gold purchased before digitalization

**Table 5: Difference in the quantity of gold purchased before and after digitalization (test statistics)**

**Test Statistics<sup>a</sup>**

	Quantity of gold purchased after digitalization. - Quantity of gold purchased before digitalization
Z	-3.456 <sup>b</sup>
Asymp. Sig. (2-tailed)	.001**

(Source: Primary Data Survey)

- a. Wilcoxon Signed Ranks Test
- b. Based on negative ranks.

**From the analysis it is evident that there exists a significant difference in the quantity of gold purchased before and after digitalization at 1% level of significance as p value is less than 0.01. As on average the quantity of gold purchase has increased after digitalization there is significant impact of digitalization on the quantity of gold purchase**

**Hypothesis : There is no significant difference in the source of gold purchased before and after digitalization**

**Table 6: Source of gold purchased before and after digitalization**

**Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
Family goldsmith-Before	254	2.33	1.157	1	4
Local gold showrooms	254	2.31	1.019	1	4

Branded gold showrooms- Before	254	2.83	1.063	1	4
Online-Before	254	3.70	.688	1	4
Any other (Please specify)	254	3.82	.525	1	4
Family goldsmith-After	254	2.63	1.106	1	4
Family goldsmith-After	253	2.29	1.032	1	5
Branded gold showrooms- After	254	2.41	1.145	1	5
Online-After	254	3.55	.792	1	5
Any other (Please specify)	254	3.83	.547	1	5

(Source: Primary Data Survey)

### Wilcoxon Signed Ranks Test

**Table 7: Source of gold purchased before and after digitalization (Ranks)**

#### Ranks

	N	Mean Rank	Sum of Ranks
Family goldsmith-After -Negative Ranks	32 <sup>a</sup>	41.91	1341.00
Family goldsmith-Before Positive Ranks	69 <sup>b</sup>	55.22	3810.00
Ties	153 <sup>c</sup>		
Total	254		
Local gold showrooms-After -Negative Ranks	51 <sup>d</sup>	52.77	2691.50
Local gold showroom before Positive Ranks	50 <sup>e</sup>	49.19	2459.50
Ties	152 <sup>f</sup>		
Total	253		
Branded gold showrooms-After - Branded gold showrooms-Before -Negative Ranks	80 <sup>g</sup>	52.08	4166.00
Positive Ranks	17 <sup>h</sup>	34.53	587.00
Ties	157 <sup>i</sup>		
Total	254		
Online-After - Online-Before -Negative Ranks	38 <sup>j</sup>	30.54	1160.50
Positive Ranks	18 <sup>k</sup>	24.19	435.50
Ties	198 <sup>l</sup>		
Total	254		
Any other (Please specify) -Negative Ranks	12 <sup>m</sup>	17.08	205.00
Any other (Please specify) Positive Ranks	17 <sup>n</sup>	13.53	230.00
Ties	225 <sup>o</sup>		
Total	254		

(Sources: Source: Primary Data Survey)

**Table 8: Source of gold purchased before and after digitalization( test statistics)**

<b>Test Statistics<sup>a</sup></b>					
	Family goldsmith-After - Family goldsmith-Before	Local gold showrooms after and before	Branded gold showrooms-After - Branded gold showrooms-Before	Online-After - Online-Before	Any other (Please specify) - Any other (Please specify)
Z	-4.327 <sup>b</sup>	-.408 <sup>c</sup>	-6.681 <sup>c</sup>	-3.047 <sup>c</sup>	-.280 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000**	.684	.000**	.002**	.779

(Source: Primary Data Survey)

- a. Wilcoxon Signed Ranks Test
- b. Based on negative ranks.
- c. Based on positive ranks.

It is observed from the analysis that there exists significant difference in the source of gold purchase before and after digitalization as far as family goldsmith, Branded gold showrooms and online purchase is considered

**Hypothesis: There is no significant difference in the type of payment for gold purchased before and after digitalization**

**Table 9: Difference in the type of payment for gold purchased before and after digitalization**

**Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
Cash-Before	254	1.44	.868	1	6
Through gold schemes-Before	254	3.01	.941	1	4
Credit card-Before	254	3.33	.916	1	4
Sale of old gold-Before	254	2.96	.969	1	5
Debit card-Before	254	3.02	1.056	1	4
Purchase on credit from family goldsmith-Before	254	3.37	.852	1	4
Cash-After	253	1.72	.995	1	4
Through gold schemes-After	254	2.89	.986	1	4
Credit card-After	254	3.07	1.072	1	4
Sale of old gold-After	254	3.03	.978	1	4
Debit card-After	254	2.72	1.105	1	4



Purchase on credit from family goldsmith-After	254	3.52	.814	1	6
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(Source: Primary Data Survey)

### Wilcoxon Signed Ranks Test

**Table 10: Difference in the type of payment for gold purchased before and after digitalization(ranks)**

#### Ranks

	N	Mean Rank	Sum of Ranks
Cash-After - Cash-Before	Negative Ranks	15 <sup>a</sup>	40.47
	Positive Ranks	60 <sup>b</sup>	37.38
	Ties	178 <sup>c</sup>	
	Total	253	
Through gold schemes-After - Through gold schemes-Before	Negative Ranks	53 <sup>d</sup>	43.22
	Positive Ranks	32 <sup>e</sup>	42.64
	Ties	169 <sup>f</sup>	
	Total	254	
Credit card-After - Credit card-Before	Negative Ranks	54 <sup>g</sup>	36.00
	Positive Ranks	15 <sup>h</sup>	31.40
	Ties	185 <sup>i</sup>	
	Total	254	
Sale of old gold-After - Sale of old gold-Before	Negative Ranks	37 <sup>j</sup>	45.23
	Positive Ranks	52 <sup>k</sup>	44.84
	Ties	165 <sup>l</sup>	
	Total	254	
Debit card-After - Debit card-Before	Negative Ranks	65 <sup>m</sup>	51.72
	Positive Ranks	30 <sup>n</sup>	39.95
	Ties	159 <sup>o</sup>	
	Total	254	
Purchase on credit from family goldsmith-After - Purchase on credit from family goldsmith-Before	Negative Ranks	19 <sup>p</sup>	24.92
	Positive Ranks	39 <sup>q</sup>	31.73
	Ties	196 <sup>r</sup>	
	Total	254	

(Source: Primary Data Survey)

**Table 11: Difference in the type of payment for gold purchased before and after digitalization (test statistics)**

#### Test Statistics<sup>a</sup>

	Cash- After Cash- Before	Through gold schemes-After Through gold schemes- Before	Credit card-After Credit card- Before	Sale of old gold-After Sale of old gold- Before	Debit card- After Debit card- Before	Purchase on credit from family goldsmith-After Purchase on credit from family goldsmith-Before
Z	-4.449 <sup>b</sup>	-2.108 <sup>c</sup>	-4.514 <sup>c</sup>	-1.409 <sup>b</sup>	-4.091 <sup>c</sup>	-3.092 <sup>b</sup>
Asymp. Sig. (2- tailed)	.000**	.015	.000**	.159	.000**	.002**

(Source: Primary Data Survey)

- a. Wilcoxon Signed Ranks Test
- b. Based on negative ranks.
- c. Based on positive ranks.

It is observed from the analysis that there exists significant difference in the type of payment for gold purchase before and after digitalization as far as cash, through gold schemes, credit card, debit cards and Purchase on credit from family goldsmith are considered at 1% level of significance as p values are less than 0.01

## X RESULTS & DISCUSSIONS

Digitalization has caused customers to move towards Corporate branded jewellery stores to a large extent due to convenience in gold purchase through monthly schemes and instalments, ready availability of plenty of patterns and types of gold ornaments facilitating immediate purchase rather than the order and wait method, online payments for monthly schemes, aggressive marketing of gold schemes, special discounts and offers for scheme purchasers, festival offers, birthday and anniversary discounts, additional discounts on diamonds etc are the marketing strategies employed by Corporate retailers of gold to draw customers away from traditional goldsmiths. Another important cause for the shift is that the customer is more conscious of quality of gold purchased and insists on the 916 brand of purity. Many goldsmiths are unable to provide this purity standard to their customers and thus have lost out on customers.

### TRADITIONAL GOLDSMITHS VS CORPORATE GOLD RETAIL

1. When jewellery is bought for gifting purpose the population still wants to buy it from their family jewellers.
  2. Flexibility in payment, availability of credit on gold purchase by family gold smiths who accept part payments from old customers ensure that even if a customer buys part of his or her gold in branded showrooms, some amount of jewellery will be bought regularly from the family gold smith.
  3. These jewellers will continue to serve their customers because of the trust that they have with their customers and also because they charge reasonable making charges.
  4. These family jewellers are also popular for traditional designs hence when a customer is specifically looking out for traditional jewellery they approach these jewellers.
  5. Traditional jewellers have personal contact with the customers as they have been associated with them for generations. This provides them an advantage over retail shops which cannot boast of personal touch in sale of jewellery.
  6. Traditional goldsmiths provide customization in making jewellery. Branded stores only try to push the products that are already available on their shelves.
  7. Customization of gold jewellery and the concept of ordering gold according to one's own choice and preference helps in maintaining good relationship with the customers.
  8. Jewellers should try to provide better quality of jewellery to customers at reasonable price. Transparency in charges charged by traditional goldsmiths helps in maintaining trust in customer relationships.
- Finally jewellers should focus on all the factors which motivate a customer to buy branded jewellery over unbranded jewellery.

## CUSTOMER PREFERENCES BEFORE AND AFTER DIGITALISATION

1. It was observed that before digitalization majority of the respondents, 44.5% purchased only 1 – 8 gms of gold per annum, 42.9% purchased 9 – 24 gms. 8.7% of the respondents purchased 25 – 40 gms. The least percentage is 1.2% who purchased more than 65gms along with 2.8% of the respondents who purchased 41 – 64 gms. After digitalisation the purchase of gold pattern changed. 48% of the respondents purchase gold from 9 gms – 24 gms and 33.9% of the respondents purchase gold from 1 – 8 gms. Before digitalisation the purchase of gold was more in the category of 1 to 8 gms but after digitalization the purchase of 9 to 24 gms has made an increase. 13% of respondents purchase 25 – 40 gms. 3.1% of the respondents purchase 41 – 64 gms and 2% of the respondents purchase more than 65 gms.

Before digitalization only 1.2% of the respondents purchased more than 65 gms but after digitalization 2% of the respondents purchase more than 65 gms of Gold. Thus there is a clear indication that the quantum of gold purchased by customers has increased after digitalization.

2. It was found that out of 254 respondents 125 (49.2%) of them have not availed gold savings scheme/chits before digitalization. 29.2% have one scheme, 11.8% have taken 2 schemes. 3.9% of the respondents have 3 schemes, following 2.0% have four schemes. Apart from these, only 0.8% has 5 schemes and 3.1% of the respondents have more than five gold schemes. After digitalization the percentage of respondents who did not have gold schemes has decreased from 49.2% to 43.3% that proves that after digitalization many more people started gold schemes. 26.8% have one gold scheme and 16.1% of the respondents have 2 gold schemes. The least percentage is 0.4%, that means only 1 out of 254 respondents have 5 gold schemes; following 2.8% of the respondents have more than five gold schemes. Apart from these, 7.1% of the respondents have three schemes and 3.5% of the respondents have four schemes. This clearly shows that there is a marginal increase in the number of gold schemes after digitalization.

3. There exists significant difference in the source of gold purchase before and after digitalization as far as family goldsmith, Branded gold showrooms and online purchase is considered.

## CONCLUSION

Digitization could bring major benefits for jewellery retailers, as maintaining captive client base and reaching out to new customers requires digital engagement and outreach. Digitization of the supply chain would ensure that every shop will have access to best-in-class design. Retailers will then be able to provide their clients with a wider range of services, such as digital gold, insurance, and finance, in a more seamless manner. Since gold is the best investment in these volatile markets, customers are likely to purchase more gold in the coming years. Digitization will not only affect investment demand for gold but this product could cannibalize ETFs. Indians will build on their love for gold this year, as pent-up demand heralds a period of robust sales. This was the main finding in the World Gold Council's recent report – The Drivers of Indian Gold Demand. The report stated that imports remain strong and retail demand was expected to pick up, when pandemic-restrictions were lifted across the country. Data from the previous year illustrates this point. India spent a record \$55.7 bn on gold imports in 2021, buying more than double the previous year's tonnage. The 2021 gold import bill also surpassed the previous high of \$53.9 bn in 2011. Gold's price drop favoured retail buyers and there was strong pent-up demand for weddings in October last year. Rising incomes are one of the biggest single

drivers of long-term gold demand. This suggests that as India's economy grows, demand for gold should increase, the report stated. However, a fall in employment numbers, particularly salaried employment, and a poor consumer sentiment index could seriously affect the sale of the yellow metal in India.

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# To Identify Motivational Factors of Working Women in Urban Bengaluru for Work-Life Balance Through a Survey Method

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## **ABSTRACT**

*Bengaluru Urban Life (BUL) is a challenging task to lead a good life in recent years. The cost of living is increasing day by day due to inflation. The women population is getting a good education and also competent enough with their inherent skills and knowledge. So inevitably women need to work for the financial stability of the family. Women can make informed decisions in the family because of their intelligence and education. Women involve themselves in all the household activities and also manage their professional life as well.*

*This Research explores the way of living of Working Women in Urban Bengaluru which consists of many Motivational factors. The Micro factors and Macro factors were analyzed in detail. The Micro factors are at the personal or individual level in joint/individual families and Macro factors are at the official level. The relationship between Micro and Macro factors of Working Women will lead to a balance between home and office. An effort is made to design a Work-Life Balance (WLB) model using Micro and Macro factors.*

**Keywords:** Work-life balance (WLB), working women, personal life, and joint family.

## **INTRODUCTION**

In the past, women played a significant role in homemaking as they were responsible for caring for children, elderly parents, and other relatives. The concept of the Joint family was very much in practice. The male fraternity at that time used to think that women only had to take care of the family and every domestic necessity, the rest was taken care of by themselves. Now things have changed over the last ten to twenty years. With the absorption of technology and education from women, fraternity is enabling them for economic independence along with family-supporting activities.

Women have started to enter the workforce and have developed strong identities in society as well as contributing positively to the economic conditions of households and the country at large. With the rise of urbanization, workers are moving to tier 1 and tier 2 cities to establish their nuclear families through collaborative efforts of the husband and wife to better living conditions.

Managing the day-to-day activities of raising the family and completing the assigned work at the workplace are the two dimensions of working women's need a comprehensive inquiry and investigation.

Multiple issues and challenges will arise for working women in the workplace and also in their personal life. Work-Life balance is becoming a challenge and critical for women employees. The required proportion of balance in work and family leads to the success of

women employees. This survey study explores the dimensions and tries to identify motivational factors for WLB.

Women are currently having a lot of difficulties in balancing their personal and professional lives. The work-life balance of working women consists of a variety of factors such as time management, work pressure, targets, a lack of coworker coordination, harassment, and lack of family support, etc.,.

To face the challenges of work and daily life, they are going through a lot of pain. Most women never give up and successfully lead their professions despite having several work-related issues. This survey will revolve around five main areas such as Personal life expectations, Satisfaction with one's own life, Job requirements, workload management, and job satisfaction of women who are predominately working in Bangalore City.

## **REVIEW OF LITERATURE**

1. Annu. Rev. Sociol. (2002)

This paper studied widely about women's employment in Western countries and Eastern Europe. Discussed three approaches. The micro-level approach compares individual results, the macro-level approach gives institutional context, and the micro-macro approach gives individual and institutional factors.

2. Gayatri Pradhan (2016)

Identifies how working women balance family life and work environment. Discussed the work-family roles of other countries which are different from other countries and analyzed how work-life balance issues are different across different countries

3. Dr. C. L. Gayathridevi (2014)

Identified and evaluated the women entrepreneurs in Bangalore's urban district. The results ranked barriers faced by women from financial, marketing, general, production, workplace facility, and health barriers.

4. McLellan and Uys (2009)

It was reported that self-employed women credited their organizational skills for allowing them to structure their daily schedule and plan their activities, which allowed them to strike a balance between work and family life.

## **OBJECTIVES**

To conduct an online survey to identify motivational factors of working women in Urban Bengaluru.

## **RESEARCH METHODOLOGY**

This study is descriptive and analytical in nature. The primary data is collected through an online survey which includes 40 respondents of working women in Bangalore. A well-designed questionnaire was sent to their email ids and data was collected with 30 questions. The study's respondents were chosen using a sampling technique. Secondary sources for the data included the usual books, journals, magazines, newspapers, and websites. Question Pro software was used for data processing.

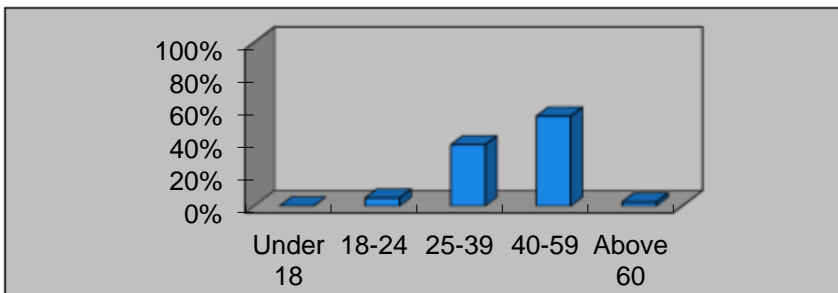
## **DATA ANALYSIS**

The researcher used percentage analysis, Bar Graphs, Pie Charts, and Mean and Standard Deviation to examine the information gathered from the respondents.

**Table1: Classification on the basis of Age**

Age	Percentage (%)	No of Respondents
Under 18	0%	0
18-24	5%	2
25-39	38%	15
40-59	55%	22
Above 60	3%	1
Total	100%	40

**Graph 1**

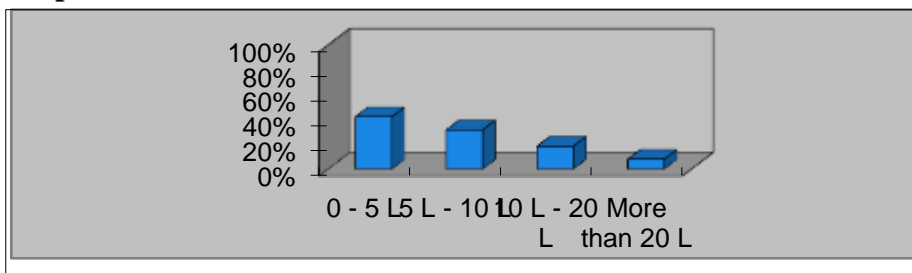


**Interpretation:** It is evident from the above table and graph that the majority of the respondents are in the age group of 25-59 years (about 93%)

**Table2: Data about income-wise classification**

Annual Income	Percentage (%)	No of Respondents
0 - 5 L	42%	16
5 L - 10 L	32%	12
10 L - 20 L	18%	7
> 20 L	8%	3
Total	100%	38

**Graph 2**

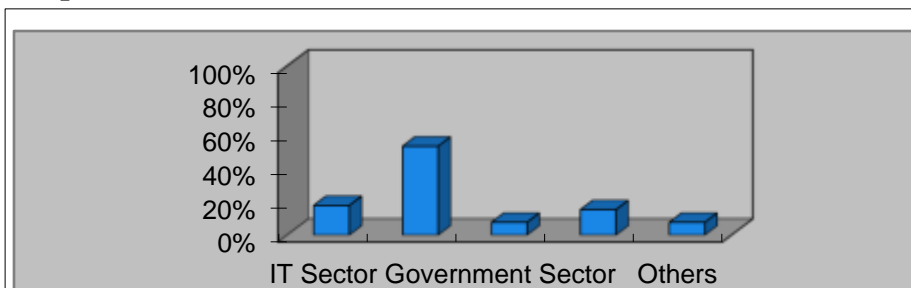


**Interpretation:** It is clear from the above table that 42 % of the respondent's income is between 0-5L and 32 % from 5 L to 10 L-20L.

**Table 3: Data based on Area of Work**

Area of Work	Percentage (%)	No of Respondents
IT Sector	18%	7
Education Sector	53%	21
Government Sector	8%	3
Private Sector	15%	6
Others	8%	3
Total	100%	40

**Graph 3**

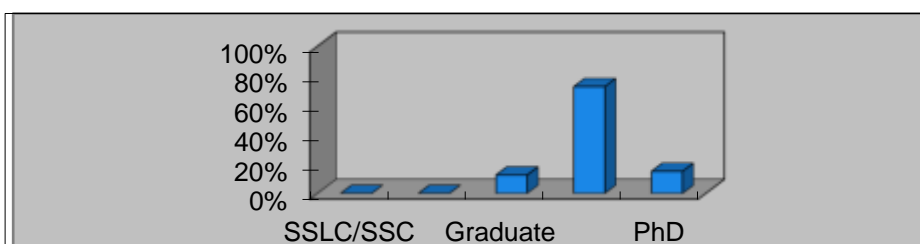


**Interpretation:** Many of the respondents are from Education Sector

**Table 4: Data based on Educational Qualification**

Educational Qualification	Percentage (%)	Count(N)
SSLC/SSC	0%	0
PUC/Intermediate	0%	0
Graduate	13%	5
Post Graduate	73%	29
PhD	15%	6
Total	100%	40

**Graph 4**



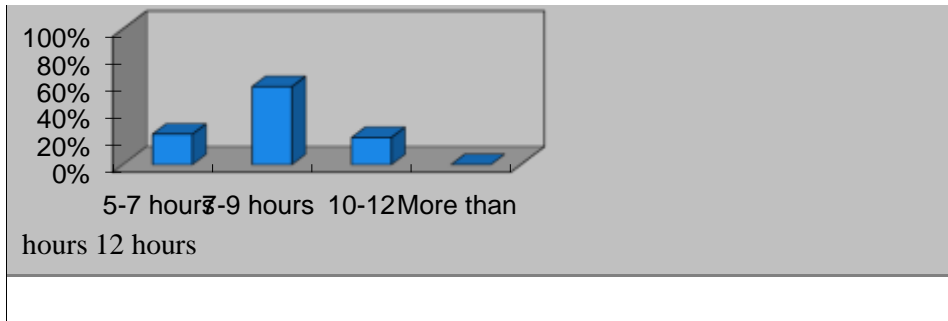


**Interpretation:** Almost all the employees are Post Graduates, and some are Graduates.

**Table 5: Data showing the Number of Working Hours**

Working Hours	Percentage (%)	No of Respondents
5-7 hours	23%	9
7-9 hours	58%	23
10-12 hours	20%	8
More than 12 hours	0%	0
Total	100%	40

**Graph 5**

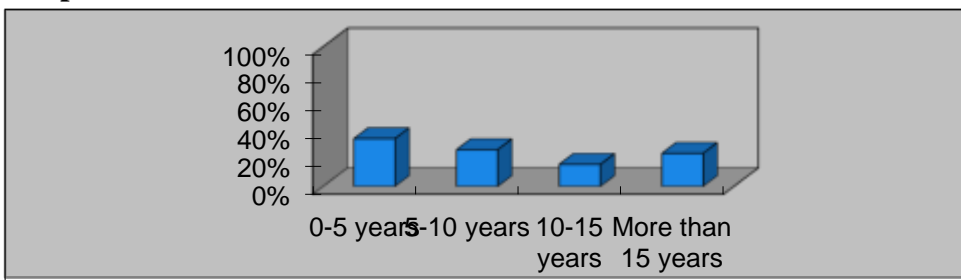


**Interpretation:** Almost half of the respondents work from 7-9 Hours daily

**Table 6: Data showing the Longevity of Service of employees**

Longevity of service	Percent (%)	No of Respondents
0-5 years	34%	13
5-10 years	26%	10
10-15 years	16%	6
More than 15 years	24%	9
Total	100%	38

**Graph 6**

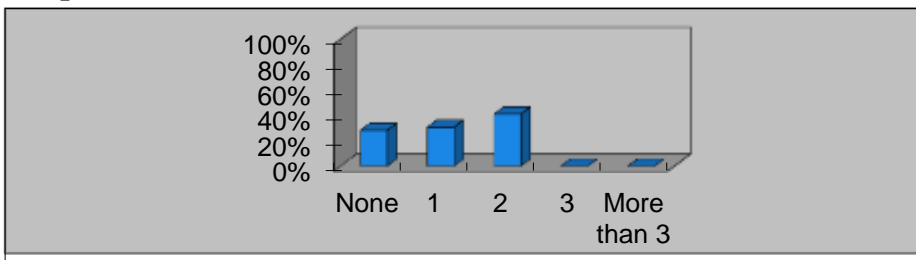


**Interpretation:** The majority of the respondents have 0-5 yrs the as the length of service

**Table 7: Table consists of Number of children**

No of Children	Percentage (%)	No of Respondents
None	28%	11
1	31%	12
2	41%	16
3	0%	0
More than 3	0%	0
Total	100%	39

**Graph 7**

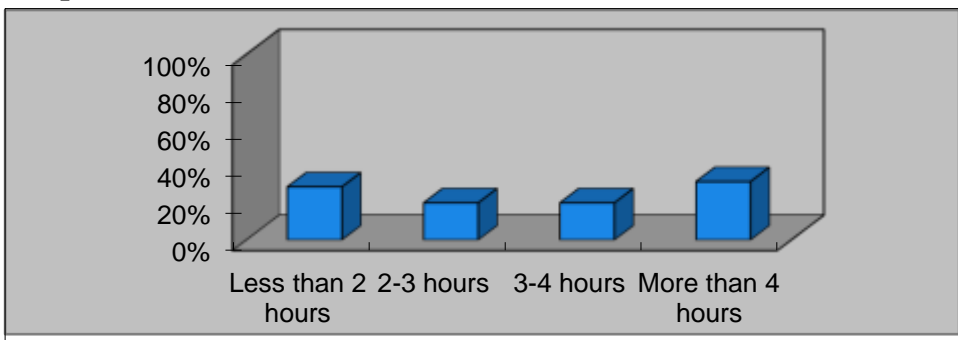


**Interpretation:** The majority of the respondents have 2 kids.

**Table 8: Table showing the Number of hours spent with kids**

Hours spent with Kids	Percentage (%)	No of Respondents
Less than 2 hours	29%	10
2-3 hours	20%	7
3-4 hours	20%	7
More than 4 hours	31%	11
Total	100%	35

**Graph 8**

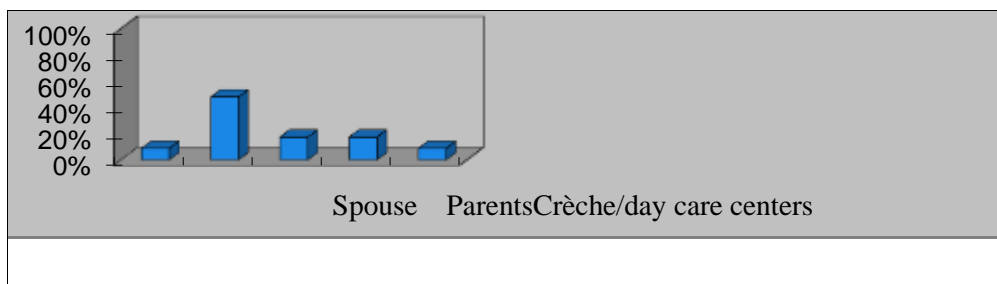


**Interpretation:** From the above table 31 % of respondents spent More than 4 hrs. with kids and 29% of respondents spent less than 2 hrs.

**Table 9: Data of Caretakers of children of women employees**

Caretakers	Percentage (%)	No of Respondents
Spouse	9%	2
In-laws	48%	11
Parents	17%	4
Servants	17%	4
Crèche/daycare	9%	2
Total	100%	23

**Graph 9**

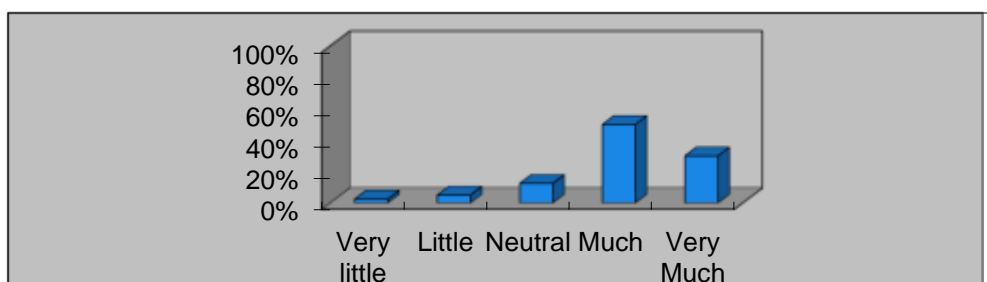


**Interpretation:** Around 48 % of the Respondents gets help from In-laws to take care of their children.

**Table 10:**

Support from family	Percentage (%)	No of Respondents
Very little	3%	1
Little	5%	2
Neutral	13%	5
Much	50%	20
Very Much	30%	12
Total	100%	40

**Graph 10**

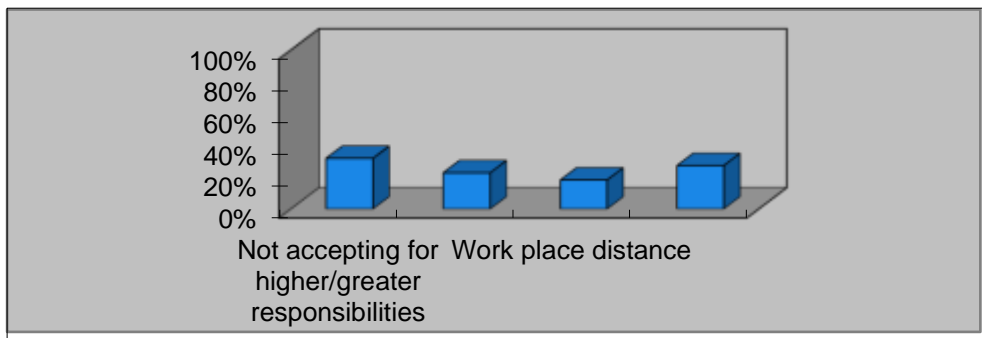


**Interpretation:** The above table gives the information that almost half of the respondents get support from family to work.

**Table 11: Data comprising some factors of compromising for professional growth**

Compromising factors for professional growth	Percentage (%)	No of Respondents
Not accepting higher/greater responsibilities	32%	7
Not ready to relocate	23%	5
Workplace distance	18%	4
Medical conditions of the self/family members	27%	6
Total	100%	22

**Graph 11**



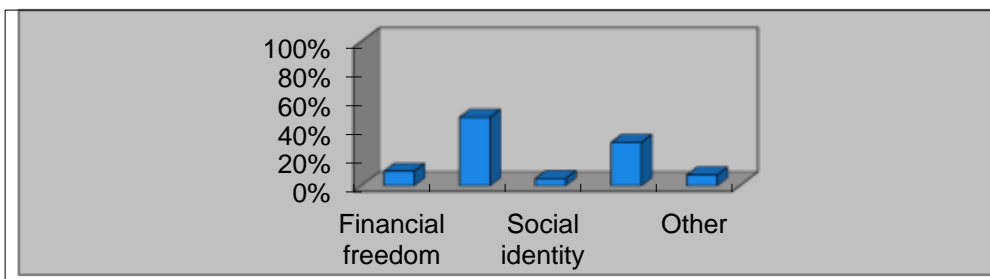
**Interpretation:** Some of the respondents are not accepting higher responsibilities because of family commitments.

**Table 12: Data consists of motivational factors of working women for job**

Motivation to work	Percentage (%)	No of Respondents
Financial freedom	10%	4
Self-satisfaction	48%	19
Social identity	5%	2
Financial support to the family	30%	12
Other	8%	3
Total	100%	40

## Graph

12



**Interpretation:** Almost many respondents are motivated to work for financial freedom and financial support for the family.

### FINDINGS:

The survey says that 50 % of the working women living in joint families are getting maximum support from In-laws who take care of children when women are at the job. Maximum support is given by the family members for women for their individual growth. It is identified from the survey that the main motivational factors of working women are self-satisfaction and giving financial support to the family. Women get support not only from family but she gets support from Employers as well for their professional career growth. Even though women get support from family members as well as from the company she is compromising for higher positions.

### CONCLUSION:

The survey depicts motivational factors such as self-confidence and career aspirations playing dominant roles. Family support plays a crucial role in the handling of domestic activities and challenges. This survey can be extended to a larger group to get more reliability and validity.

### LIMITATIONS OF THE STUDY:

The investigation was conducted with a small sample size due to time constraints. Only working women in Bangalore city have been the target of the researcher's focus. The opinions and perceptions of their respondents will influence how the working women respond.

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# Psychological biases in Investment decision: A Systematic review

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## **Abstract**

*The purpose of this paper is to Review the literature published in the area of psychological biases in Investment decision focusing on 8 psychological biases influencing Investment decisions. The research articles for the study have been collected & considered from year 2000 till 2020, a period of 2 decades presenting the overview of 50 research articles of National & International scale along with the Text & report references. The Objective of the paper is to identify the gaps in the existing studies on Impact of psychological biases on investment decisions.*

*This research paper can be of use to the investors to understand the biases influencing, researchers to assist in their knowledge base on the area of psychological biases in investment decisions.*

**Key words:** Psychological biases, Behavioural finance, Investment decisions

## **Introduction**

A Sub area of research in the field of behavioural finance is the study of investors perception and behaviour. Multiple studies have been conducted to understand and assess the market trends, technical analysis etc. Study of investors perception explains exactly how the investors judge, predict, investigate and review the processes for decision making that includes investment psychology, information gathering, defining and understanding, research and analysis.

As Benjamin graham rightly said “The investor’s chief problem & even his worst enemy is likely to be himself”. In the Investment process, investors often experience the “roller coaster of emotions” which leads in irrational decision making with respect to investment. A Lot of Irrational investment behaviour is identified amongst the Investors. People often tend to invest in wrong avenues or end up risking the hard-earned money. Hence, understanding the biases involved in investment decision making helps in keeping track of their investment pattern & reducing any such errors.

**Schindler (2007)** lists three main cornerstones of research in Behavioural finance namely: sociology, psychology, and finance which are the disciplines contributing invariably towards the Behavioural economics & Behavioural fiancé.

- **Sociology:** is the systematic study of human social behaviour and groups, and the influence of social relationship on attitude and behaviour.
- **Psychology:** is the scientific study of behaviour and mental processes, which is affected by human's physical, mental, and external environments.
- **Finance:** is the discipline concerned with determining the value and making decisions. The finance function allocates capital, including the acquisition and allocation.

Behavioural aspects discussed in the area of Behavioural finance are backed by certain Human behavioural theories as follows:

#### **Human behavioural theories:**

1. **Prospect Theory:** The Prospect theory was originally conceived by **Kahneman and Tversky (1979)** and later resulted in Daniel Kahneman being awarded The Nobel Prize for economics. The theory distinguishes two phases in the choice process: the early phase of framing (or editing) and the subsequent phase of evaluation. Tversky and Kahneman, by developing the prospect theory, showed how people manage risk and uncertainty. In essence, the theory explains the apparent irregularity in human behavior when assessing risk under uncertainty (**Subash 2012**). People place much more weight on the outcomes that are perceived more certain than that are considered merely probable, a feature known as the "certainty effect" (**Kahneman & Tversky, 1979**).

2. **Heuristics Theory:** "Heuristics are simple efficient rules of the thumb which have been proposed to explain how people make decisions, come to judgments, and solve problems, typically when facing complex problems or incomplete information. These rules work well under most circumstances, but in certain cases lead to systematic cognitive biases" **Daniel Kahneman (Parikh, 2011)**. Tversky and Kahneman identified the influence of human heuristics on the decision-making process. Tversky defined heuristic as a strategy, which can be applied to a variety of problems, that usually—but not always—yields a correct solution. People often use heuristics (or shortcuts) that reduce complex problem solving to more simple judgmental operations (**Tversky and Kahneman, 1981**). The heuristic decision process is the process by which the investors find things out for themselves, usually by trial and error, lead to the development of rules of thumb. In other words, it refers to rules of thumb, which humans use to make decisions in complex, uncertain environments (**Brabazon, 2000**). Behavioural finance equips finance professionals with a magnifying lens which allows them to scrutiny, understand, and overcome many proven psychological traps that involving behavioural biases i. e. emotional biases and cognitive biases. It is applicable to,

- Investors – (Retail & High Net-worth Individuals)
- Corporate (Mutual Fund House, FII's)
- Markets (Equity, Commodity, Currency, Debt etc)
- Regulators (SEBI/FMC etc.)
- Finance Professionals – Portfolio Manager, Analysts, Policy Makers etc.

#### **Objective of the study**

The Primary objective of this study is to analyse the Impact of select psychological biases in Investment decisions studied by various authors in the past 2 decades & to identify the gaps in the existing studies on Impact of psychological biases on investment decisions:

- a) Overconfidence bias
- b) Regret bias
- c) Herding bias



- d) Endowment bias
- e) Anchoring bias
- f) Overconfidence bias
- g) Herding bias
- h) Loss aversion bias

### **Purpose the study**

The Purpose of this study is to determine the 8 select biases influencing the decision making of an investor through a systematic review of 50 articles published in international journals for a period of 20 years. The review has been on articles discussing various behavioural biases influencing Investment decisions in many countries namely, India, Pakistan, Indonesia, Malaysia, West Africa etc.

Reports of OECD & INEF reveals that Behavioural sciences focus on the way people think & behave & it is often times identified that people end up investing in wrong avenue or not invest at all.

Study of Psychological biases helps in understanding the background & rational behind the behaviour of an investor. India is a developing country with only 3% of the population investing and hardly 0.9% of them are reaping the benefits of rational investment.

### **Research methodology**

The study being purely secondary data based, has considered around 50 different sources such as text books, committee reports, journals and other publications. Select publications are systematically reviewed based on the select 8 psychological biases. The rational behind choosing 8 biases out of almost 22-25 existing biases is simply the fact that these are the most common biases one faces in almost every kind of investment decision making.

### **Literature review**

**Chandra & Abhijeet(2008)**, identified from their study that investment decision-making is influenced, to a great extent, by behavioural factors like greed and fear, cognitive dissonance, heuristics, mental accounting, and anchoring.

**Mitroi(2014)**: identified that behavioral biases are detrimental to the investment return of individual investor portfolios. As a direct influence of behavioral biases, the intuitive correlation between risk and return does not hold. Low risk investments have the highest returns along all dimensions of the market.

**Baker & Ricciard(2015)**: conducted a conceptual review on psychological biases in investment decision making focusing on how Investors display many behaviour biases that influence their investment decision-making processes. researchers described some common behavioural biases and suggest how to mitigate them. It was identified that Although investors cannot avoid all biases, they can reduce their effects. This requires understanding one's behavioural biases, resisting the tendency to engage in such behaviours, and developing and following objective investment strategies and trading rules. Investors also need to invest for the long-term, identify their level of risk tolerance, determine an appropriate asset allocation strategy, and rebalance portfolios at least yearly. Because many experienced and seasoned investors have learned that success often comes from reining in emotions and overcoming their biases, they often avoid making the same mistakes as many new investors.

**Riaz & Iqbal(2015)**: explored the impact of behavioral biases on Investment Decision by incorporating the behavioral model. For which four behavioral biases were selected i.e.

optimism, overconfidence, illusion of control and self-control. Data for behavioral biases and investment decision were collected from investors in Karachi Stock exchange through administering 100 questionnaire. The results of study reveal that in Pakistan investors are biased while making investment decision.

**Bakara & Chui Yi(2015):** attempted to bridge the gap of the differences in terms of geographical location and demographic profile between Malaysia and other countries by examining the impact of the psychological factors on investors' decision making in the Malaysian stock market. By using Questionnaires as a tool for primary data collect from sample size of 200 investors in the Klang Valley and Pahang areas aged between 18-60 years who are involved in the Malaysian stock market to identify the impact on decision making based biases such as overconfidence, conservatism and availability. while the study revealed that herding behaviour has no significant impact on the investors' decision making. It is also found that the psychological factors are dependent of individual's gender. The results of this research are mostly consistent with the evidences in previous studies. This study was conducted with a view of understanding the process of decision making in the stock market & contribute in increasing the rationality of investment decisions for enhanced market efficiency.

**Rajagopalan & Gurusamy(2015):** The investigation indicated the importance of taking psychological biases into account while studying the financial, economic and trading decisions of retail investors. Further, the results of the study has demonstrated that psychological biases are related to personality traits and thus knowledge of personality traits may assist in preventive counselling so as to minimise the influence of psychological biases on the retail investors.

**Shinde & Zanvar(2015):** aimed to examine the demographic factors influencing the risk tolerance and choice of investment amongst 670 investors in Pune. The study revealed positive impact of the factors and the same can be used by advisors for better client advises.

**Gupta & Ahmed (2016):** examined the influence of psychological factors on investors decision making in Indian stock market specifically focusing the loss aversion bias, regret aversion bias, herding bias and anchoring bias of Behavioural biases taking into consideration 380 retail investors It is identified from the study that Loss Aversion Bias, Regret Aversion Bias and Anchoring bias that affect one investor type group more as compared to the other group; both the investor groups tend to exhibit herding bias in an similar manner. experienced investors are more influenced by loss aversion, regret & anchoring biases in comparison to that of inexperienced investors. the study show that ensuing various behavioural biases may lead to bad and faulty investment decisions.

**Hayat & Anwar (2016),** Investors of Karachi Stock Exchange and Islamabad Stock Exchange were considered as sample for the study. it is identified that financial literacy has negative moderating role in herding bias & positive role in over confidence bias. It is observed by the researchers that passive investors show more herding biases & active investors show overconfidence biases.

**Rehan & umer (2017):** examined impact of behavioural biases on investor decision at Pakistan stock exchange based on sample of 385 active investors in stock market emphasizing on anchoring, risk aversion, overconfidence, representativeness & regret aversion biases which resulted in anchoring bias, mental accounting, overconfidence biases have positive impact on investment decision making.

**Bobde, Bagde & Goje(2017),** attempted to identify the impact of psychological behavior on investment decision making through sample survey conducted on 470 mutual funds investors of Nagpur city specifically focussed on endowment & self-control biases & it is

identified in the research that investors do exhibit emotional biases such as inclination towards the inherited investments, commission aversion, familiarity bias, spending on those investment which are lucrative & also it is identified that the middle class segment in the sample area as accepted Mutual fund investment whole heartedly but at the same time self-control bias exists as people fail to remain disciplined in investment.

**Chadha, et al(2018):** conducted the study with the aim of identifying the various factors that help estimate the investor sentiments, to understand the significance of demographic factors of population such as gender, age, education, occupation, income, savings and family size over the several elements of investment decisions like priorities to characteristics of investments, period of investments, reach of information source, frequency of investments and analytical abilities.

**Dervishaj(2018),** studied psychological tendencies in general which tend to error investment decision making.

**Ady (2018):** studied the impact of the expected emotion & immediate emotion in the investment decision making process. Focusing on overconfidence bias, cognitive dissonance bias, availability bias, self-attribution, loss aversion bias & familiarity bias using phenomenal approach of study which revealed that almost all the investors were subject to one or the other biases.

**Boda & Sunitha (2018):** investors behaviour was studied in chronological viewpoint using synthesis, description & comparison tools revealing psychological & emotional factors influencing investor rationality on market movements.

**Gakhar(2019):** identified individual characteristics including MBTI personality scores, risk taking behavior, biases & investors demographics influencing the investment behaviour by administering a structured questionnaire amongst 117 respondents in India based on simple random sampling. The structured questionnaire consisted of questions relating to demographic variables, optimism bias, risk taking behaviour, investment pattern and MBTI (Myers-Briggs Type Indicator) personality assessment. Results were evaluated using ANOVA & Chi-square which reflected that optimism bias is influenced by marital status, employment & work experience.it is found that majority of the respondents were either balanced or conservative in risk appetite.

**Hallale & Gadekar(2019):** started with primary goal of exploring the behavioural factors influencing person buyers' selections on the NSE & BSE Stock Exchange. The result indicated that there are 5 behavioral elements affecting the funding selections of person investors at the NSE & BSE Stock Exchange: Herding, Market, Prospect, Overconfidence, gamble's fallacy, and Anchoring-ability bias.

**Parveen & satti (2020):** studied heuristic and overconfidence cognitive biases that influence the decisions of the investors in the Pakistan Stock Exchange (PSX), using primary as well as stock market secondary data. Primary data was collected from 446 retail investors, and secondary data was collected from 301 companies listed in 35 sectors of PSX. Primary data was analysed to find out discriminant validity and composite reliability, and then the structural equation model was measured through bootstrapping and path analysis which resulted in indicating that heuristics and biases prevail in the investment decisions whereas Overconfidence bias partially mediates between the representative heuristic and investment decisions.

**Nkukpornu et.al., (2020)** examined the influence of behavioural biases on individual investment decisions in a developing country context to establish that the presence of behavioural biases plays a vital role in influencing stock investment decisions. The study finds the four preferences or biases (overconfidence, regret, belief, and snakebite) have a

significant positive and robust relationship with investment decision making in varying degrees.

**Iqbal & et all(2020):** Investigated the influence of psychological factors such as confidence, optimism, loss aversion and herding behaviour could affect investment decisions in KP's SMEs. The result binary logistic model revealed that all sub-factors of psychological are positively significant with investment decision except the loss aversion. The probability of investing in the presence of confidence (79.59%), optimism (89.90%), loss aversion (64.29%), herd behaviour (88.37%) and overall psychological factors (80.54%) in KP's SMEs.

**Sattar & tosif (2020):** explained the influence of overconfidence & anchoring biases to be true.

**Sattar (2020),** revealed that there was an effect of behavioral biases on investment decisions. Empirical results concluded investment decision making influenced by heuristic behaviors more than prospects and personality characteristics.

**Fogat et all (2022):** investigated research conducted by about 300 authors in 125 articles were reviewed and systematically organized and analysed giving a platform for researchers in the filed of behavioural finance.

## Conclusion

The review of literature from 2 decades on the area of behavioural finance, specifically psychological biases, it can be concluded that the stock market anomalies, investors irrationality are evidently attributed to the impact of various biases involved in investment decision making irrespective of experienced or inexperienced investor. Many evidences are found to back the influence of psychological or behavioural biases on investors rationality. Further research scope is to study the psychological biases impact on different avenues of investment and different categories of investors other than stock markets.

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# The Rise of HR Analytics and Its Challenges Faced by HR Professionals

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## **ABSTRACT:**

**Purpose:** *HR-analytics has been largely employed in the Western IT industry; however it's currently creating inroads within the Indian IT market as well. HR analytics contains a lot of potential within the Indian IT industry; however HR systems, teams, and people skills have plenty of flaws. HR analytics has grown up greatly in quality among practitioners and consultants within the field of human resource management. The aim of this paper is thus to look at the increase of HR analytics over the previous couple of years, explores the benefits and drawbacks of HR analytics, this study conjointly discussing the challenges faced by HR professionals.*

**Design/Methodology/Approach:** *The paper develops a conceptual framework by integrating both academic and practitioner literatures of around 15 articles, in the field of HR analytics and decision making.*

**Findings:** *From the findings, it is evident that the HR analytics benefits HR functions in many areas but still it faces big challenges in accomplish it efficiently. HR professional needs to create a deeper understanding of HR Analytics. Change era of the computer technologies, which might take place at a further step of the implementation of HR Analytics, required training has to be offered. Through continuous communication and sharing results of the outcomes of the analyses the level of understanding can be increased, new possibilities and opportunities of using HR Analytics can be discovered.*

**Research Limitations/Implications:** *The paper provides implications for both researchers and practitioners in the decision making area for improving organizations overall performance effectively and efficiently by applying HR analytics as a strategic tool to engage, retain and improve employee's performance. It also provides implications for future researchers to empirically test the conceptual framework in different organizational settings.*

**Originality/Value:** *The paper propositions perceptions on increased usage of HR analytics ,its benefits, drawbacks and the challenges faced by HR managers in*

*implementing HR analytics. Also, it delivers HR analytics can cope with the problems of intuition based decision making of the organizations.*

**Keywords:** HR analytics, decision making, HR analytics, Human Resource Management, Management Fashion

## **INTRODUCTION**

For any organization, human resources (HR) area is vital. Employees are the main asset; they are also the most essential cost. For the above reason, HR management is considered as the center pillar for any organisation. Over the number of years, managing human resources (HR) area has changed, moving from operational management towards strategic management.

Digitalization is one in every of the essential processes of technological amendment, this variation has additionally affected the management varieties of enterprises considerably. Fast developments within the web technology have additionally heterogeneous the understanding and operation of human resources management, changes that affected each HRM method. With the onset of the Fourth technological revolution, typically referred to as trade 4.0, there are new necessities which accurately force production corporations to rethink their current approaches to processes in order that they're able to survive within the surroundings of ever-increasing competition whose success relies on the automation tools, AI or selling exploitation social networks. Within the space of human resources management, these modifications are mirrored in the main within the change of the approach to employee's development.

HR controlling can be defined as an internal Human Resource Management (HRM) system which has the following core functions: staffing, development, compensation, safety and health, and employee and labour relations. HR analytics is associated with HRM, giving the emphasis on optimizing recruitment, assessment, promotion, remuneration, retention and turnover (Tursunbayeva, Di Lauro, and Pagliari, 2018). It brings with it, additionally to expertise, the capability and technical skills that are essential for any organization's long success. Organizations have typically had bother determinative the potency, status, and opportunities of their human resources. Organizations are to find even additional intelligent selections, from attracting the proper talent to maintaining the most effective talent.

Organizations are working to improve competitive advantages. Businesses are showing much interest towards adoption of such technologies and practices which may help in retaining, utilizing the HRD as human resource management plays an awfully important role in any organization. It's the only purpose of a corporation that plays an important part in its people. HRM makes all possibility of utilizing all the tools, practices, approaches, principles, and framing guidelines for the employer and employee's behavior in order that they'll come and work together to attain competitive organizational goals. With an understanding of growing importance of HRD is for any organization, these organizations are working towards the adoption of such technologies which might enhance their working. Only HR Function was lacking behind because of its dependency on metrics and scorecards of information which may be quantified, most of the HR data couldn't be



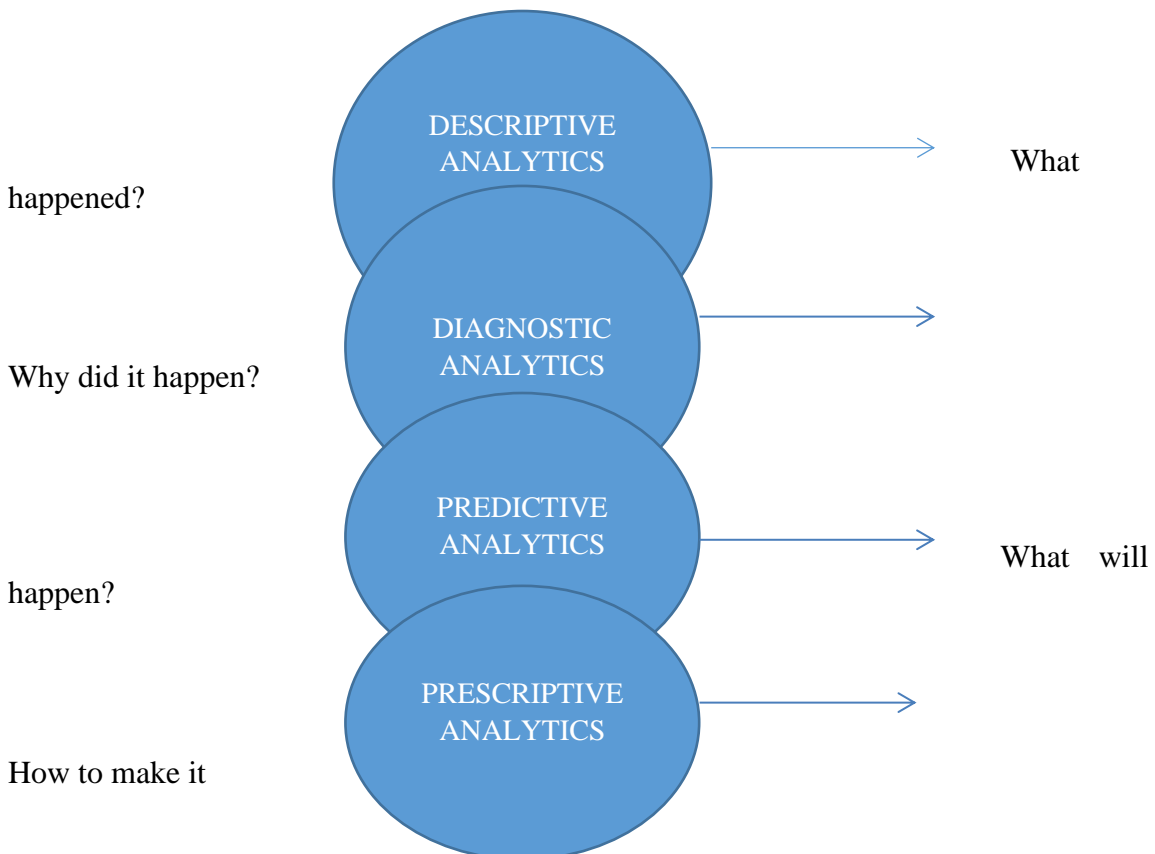
quantified due to its qualitative nature, and analysis of HR data was mostly obsessed on instincts. But now HR is looking forward of understanding how people are affecting the organization. There has been an evolution of HR analytics within the organization to become data-driven organizations where every decision at operational, functional and top levels of an organizational hierarchy relies on data to make decisions. HR analytics helps in gathering, interpreting, and measuring of HR data. HR analytics provides up-to-date and accurate data together with providing better future decisions. It helps in providing an answer to organizational problems.

## HR ANALYTICS

HR analytics also called people analytics is the quantification of people drivers on business outcomes. Analytics measure why something is happening and what the impact is of. Human Resource analytics is the process of collecting analyzing and reporting people related data for the purpose of improving decision making achieving strategic objectives and sustaining a competitive advantage.

HR analytics benefit the organisation directly in multiple ways by reducing cost associated with poor workforce planning, overstaffing, understaffing or staffing the wrong talent can all negatively impact the bottom line. Having selecting right type of analytics at right time will build the organisation to high performing one.

## TYPES OF ANALYTICS



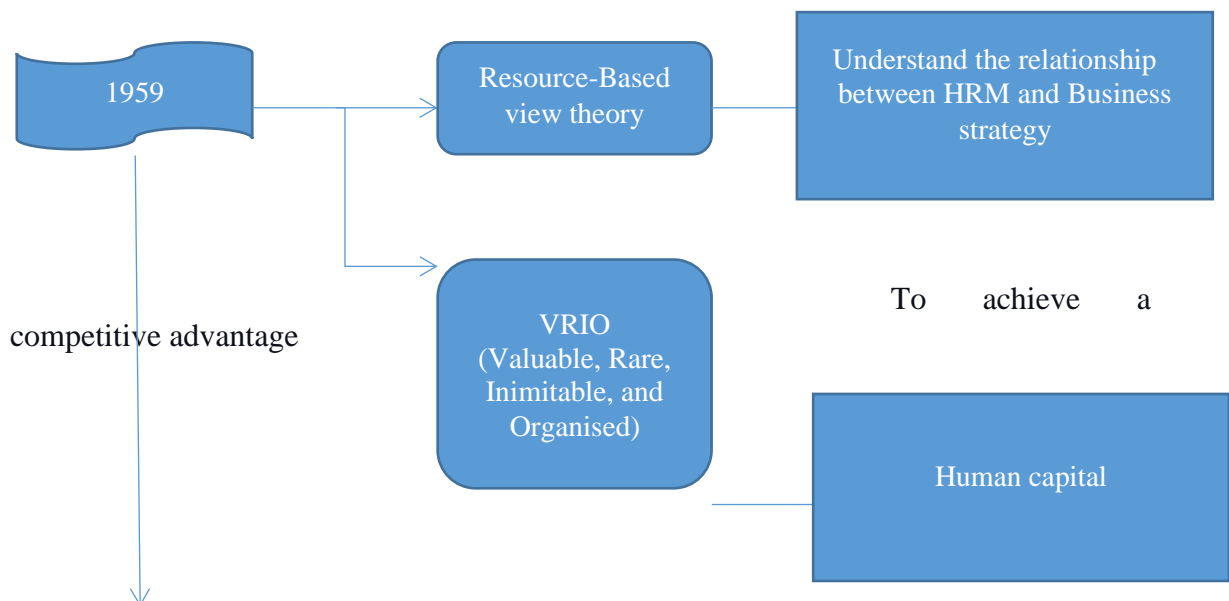
**Figure 1: analytics types**

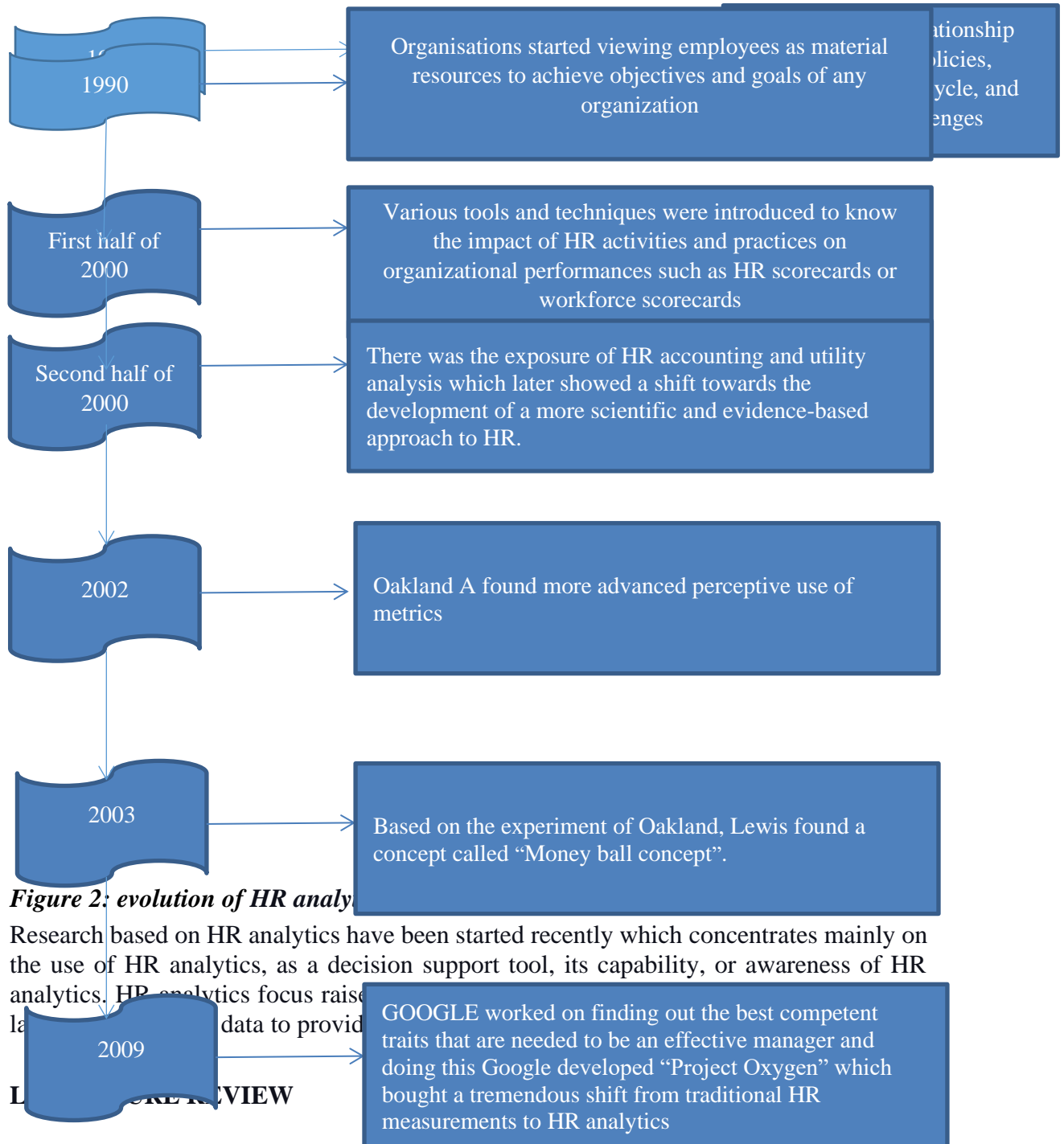
<b>Analytics types</b>	<b>Purpose</b>
<b>Descriptive analytics</b>	Describes or summarize raw data and make it something interpretable. It provides facts and figures in understandable format. It answers the question ‘what has happened ’ to the stakeholders
<b>Diagnostic analytics</b>	It deals with the process of finding out the reason that has led to an event in the past. It answers the question ‘why it happened ’
<b>Predictive analytics</b>	It extracts information from data sets in order to obtain pattern and predict the future events. It answers the question ‘what will happen’
<b>Prescriptive analytics</b>	It is a process of analyzing the data and providing instant recommendation to how to improve the performance in order to achieve the organisation goals. It answers the question ‘How to make it happen’

**Table no.1: types of analytics and its purpose**

**EVOLUTION**

Though Organisations were raising globally, the usages of HR analytics have limited functions in it. Among all other departments, Human resource department was lacking behind, due to difficulty in collecting and analyzing HR data it becomes a necessity for the evolution of HR analytics.





**Figure 2: evolution of HR analytics**

Research based on HR analytics have been started recently which concentrates mainly on the use of HR analytics, as a decision support tool, its capability, or awareness of HR analytics. HR analytics focus raised the use of data to provide

**LITERATURE REVIEW**

**Dr. P. Raghunadha Reddy, P. Lakshmikeerthi, (2017)** this paper explains the importance of HR analytics practices and its applicability in different sectors. To make accurate decisions in HR, data driven evidence based HRM should practice with analytics, decision making and problem solving.

**Dr. Abdul Quddus Mohammed (2019)** The study explores the existing literature in the field of HR analytics and their implications for predictive decision-making in Organisations. This will also include critically reviewing the literature on the integration

of HR analytics in organisational setups through the introduction of relevant IT infrastructure and provisions.

**Anna Karmańska (2020)** present the benefits of using HR analytics by conducting a questionnaire of 44 practitioners employed in HR departments of Silesian enterprises. Under this study, where 88.6% of people surveyed indicated the benefits of using HR in the area of recruitment, and 83.6% of respondents believe that analytics affects efficiency through the better planning and utilizing of the workforce, and also positively impacts the company's organizational culture. Employees from large companies demonstrate knowledge of HR analytics to a greater extent than those employed in the SME sector.

**Shivam Tomar, Dr. Mamta Gaur (2020)** this paper aims to find out the role, benefits of HR analytics and its challenges faced by HR professionals in implementing as a tool in human resource function.

**Yashi Srivastava, Saumya (2021)** the study explores the strategic role of HR analytics in different fields of HR areas and their market tools using the methodology- reviewing existing literature, interviews and questionnaires/surveys.

## **RESEARCH METHODOLOGY**

This study is conceptual in nature.

Source of Data: Secondary data- through journals, magazines, periodicals, books, websites.

The articles are read carefully and thoroughly to understand and identify the role, opportunities, and challenges of HR analytics in the current scenario.

## **OBJECTIVES:**

- To identify the role and benefits of analytics in human resource function.
- To find out the challenges faced by HR managers in implementing and using human resource analytics.

## **ANALYSIS**

### **ROLE OF HUMAN RESOURCE ANALYTICS IN HUMAN RESOURCES**

Human resource analytics plays a significant role in many companies where the Organisations have shifted towards data-driven approach at operational level, functional level and at top levels of an organisational hierarchy to make decisions. HR analytics plays a major role in workforce planning, competitive advantage, employee acquisition to employee retention, leveraging data, developing insights and models for organization, helps in performance management, recruitment and talent acquisition, budgeting HR costs and others.

#### **Recruitment and Selection**

Recruitment and selection is the process to hire qualified and right candidate for a job role of the organization. By using the data driven approach, they are able to speed up the process by analyzing, identifying and scrutinizing a prospective candidate for the job role

and the company's culture and environment. HR analytics makes the work of the HR easier and more effective. It reduces the cost and time to select qualified candidate.

### **Workforce Forecasting**

Workforce planning is the process which is designed to focus on predicting future requirements of HR workforce which can easily be interpreted from HR Analytics software tools by analyzing the data in respect to competitive and changing environment realigning them as per business needs.

### **Performance Management**

Performance management is a process in which managers and employees set performance standards of the work, monitor and review it. HR Analytics helps the managers to get a clear picture of what their employee's actual performances, where they need improvements and how to improve in terms of training and development, if required.

It also provides real-time data to managers about each employee's efficiency and their commitment towards work, which help them to evaluate the absenteeism rate.

### **Employee Attrition Rate**

Employee attrition rate refers to identify employees who are in larger risk of leaving the organization and it can be identified by analyzing and measuring the data which could helpful with the HR analytical software. HR analytical software helps to keep an eye on the behavioural aspects of employee's, employee-employer relationship, management competencies making it easy for HR to predict hidden reasons behind resignation and how they can reduce it. This helps to save the organisation from incurring huge losses in terms of employee turnover rates.

### **Predictive analysis**

It makes use of HR metrics to know where the organizations needs improvement and identify the employees who have greater chances of being part of the improvement. This is a major concern for the organization because human capital is one of the major investments of a company who can mold the company to achieve its strategic objectives.

### **Decision making**

With the introduction of HR analytics, the decision making style of organisation based on intuition has vanished which directed the organisation to achieve their objectives and goals efficiently. HR professionals with the help of data driven decisions which enable to attract, retain and improve the employee performance.

## **BENEFITS OF USING HUMAN RESOURCE ANALYTICS**

Analytics is defined as the intersection of computer science, decision-making, and quantitative methods to organize, analyze and explain the increasing amount of data generated by modern society (Mortensen, Doherty, and Robinson, 2015).

Analytics brings benefits in many HR areas of business such as

1. Helps in scrupulous arrangements of workforce management
2. Justifying manpower requirements
3. Making it easy to identify the available most suitable people at right time
4. With proper planning an effective career development of employee can be done
5. Improving manpower retention

6. Enhancing the organisational competitive strength and convert it into quality manpower
7. Ensuring ethical and responsible recruitment and selection
8. To know the factors which increase employee satisfaction and performance
9. Key performance indicators can be identified easily, which will contribute to success of the business
10. Helps in achieving strategic and business goals

## **CHALLENGES FACED BY HR PROFESSIONALS IN IMPLEMENTING HR ANALYTICS**

Human resource departments are very slow in implementing big data it's not about lack of forward thinking. They face big challenges to have this as practice in terms both of logistics and mindset.

### **Bringing together data from many different places**

Human Resource analytics requires HR professionals to acquire data from different departments within the organisation. They have to acquire, clean, unify and analyze data from multiple departments. HR departments need people with the skills required to gather and prepare data for analysis.

### **Lack of data analytics skills within HR**

Though Organisations are started implementing HR analytics in HR functions, but the hard truth is that the analytics skills of most HR professionals are limited. Most of them required enough training to become well versed in converting raw data into meaningful insights. This makes the implementation of HR analytics a difficult task.

### **Privacy and compliance**

Analytics requires a plenty amount of data to be collected from various sources in order to produce desired results. While gathering data about an employee from external sources involves privacy. Gathering personal details about employees could sometimes leave the organisation in trouble.

### **Insufficient IT Resources**

The implementation of analytics in HR is an IT oriented process. Many companies' especially smaller companies lack infrastructure facilities to implement analytics function. In addition setting up of those infrastructures becomes an expensive and time-consuming process for companies.

### **Deciding the tools**

There may be a lack of clarity while identifying the most suitable technologies for keeping track of the data.

## **SUGGESTIONS TO OVERCOME THE CHALLENGES**

The support of the companies and the upper management is very important to overcome all the above mentioned challenges

- Tools : Get training in machine learning, data mining, and algorithm and general knowledge on when to use which method
- Legal compliance: Ask for approval and show the business results of every project to clients before starting. This builds relationship and trust.
- Training and skills: undergo trainings in strategic workforce planning and analytics. Visit conferences. Develop a Human Resource Analytics team next to the HR team.

## **LIMITATIONS**

Research has been done by going through previous researches being done. This research shows only the theoretical concept of HR analytics and no practical understanding has been done to understand the opportunities and challenges of using and implementing it and also, provide possible solutions for those challenges.

## **CONCLUSION**

With the advanced technological development in industries, companies started using HR analytics to improve organisational performances that achieve organisation competitive objectives and goals. HR analytics makes every organisation to be a data-driven decision making by using statistical models and techniques. HR analytics handles all relevant data related to HR and interpret better result. Through this paper, it is analyzed that increasing usage of HR analytics in business benefits HR functions of companies in many areas such as better employee satisfaction and engagement rates, improve the hiring process, predicting, reduce attrition, employee behaviour and trends etc. Though analytics benefits Organisations in many fields it has big challenges, as the HR professionals may lack the required skills and knowledge of using the HR analytics tool or there may be data quality or data governance issues. Due to such an issue's organization may not get the support of top management. Despite such challenges, HR analytics has been helping businesses in gaining competitive advantage, solving HR related problems, improving organizational performance, and has improved HR function.

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# Sentiment Analysis of Youtube Comments in Code-Mixed Dravidian Languages

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## **Abstract:**

*This paper represents the methodologies while doing Sentiment Analysis on Dravidian code-mixed comments from youtube. Sentimental Analysis of youtube comments is a very interesting topic nowadays. The online user expresses their opinions or sentiments in the videos that they watch on Youtube. This Project represents the brief service of techniques to analyze opinions posted by users about a particular video. The process of searching the natural language to find patterns or moods of society against certain products, people, or topics is called Sentiment Analysis. Three different classifiers were examined with pretraining on Youtube Comments. The best performing configuration was Recurrent Neural Network trained only on Youtube comments with a prediction that attributes all comments classified as Positive, Negative, Unknown\_state, Mixed\_feeling, Not\_tamil. Embedding and Naïve Bayes these Algorithms are used.*

**Keywords:** Sentiment Analysis, Code-Mixed, Transformers, Tamil.

## **INTRODUCTION:**

In the past few years, usage of social media platforms has drastically increased. With this trend, cyberbullying and hate speech also increased and created a need to analyze comments on social media. Sentimental Analysis is a study that uses Natural Language Processing in identifying subjective opinions or emotional responses about a given topic. There are already multiple steps taken to make use of sentimental Analysis in monolingual texts. But there has

been an indispensable demand for sentimental Analysis in code-mixed Dravidian languages (Tamil, Malayalam, and Kannada). Systems trained on monolingual data fail on code-mixed data due to the complexity of code-switching at different linguistic levels in the text. Natural Language Processing is a cutting-edge technology that gives computers the information they need to understand the language we speak. Sentiment Analysis is a categorization approach that offers sentiment about the subject collectively.

## **RELATED WORK:**

Cyberbullying and hateful speech are unpleasant parts of social media. To ensure the well-being of social media users from cyberbullying, social media companies always had to invest/contribute to sentimental analysis research. Due to that, an adequate amount of studies has been already done. Historically, there have been two approaches to solving sentimental analysis problems lexicon-based and machine-learning approaches.

Even though they produce moderately quality results, they failed against human-

generated data. Due to that, new deep learning models such as Bidirectional Recurrent Neural Networks (RNN)[7] and Long Short-Term Memory(LSTM) networks [8] were introduced. On the other hand, [9] conducted experiments in Kannada-English using traditional learning approaches such as Logistic Regression(LR), Support Vector Machine(SVM), Multinomial Naive Bayes, K-Nearest Neighbors(KNN), Decision Trees(DT), and Random Forest (RF). We need a corpus to address the sentiment analysis problem using the above techniques. Since social media comments/posts do not follow strict grammar rules and also they are always in non-native scripts as well as code-mixed [10]. [11] created a gold standard Tamil-

English code-switched, sentiment-annotated corpus containing 15,744 comment posts from YouTube to overcome the above situation. Moreover, Chakravarthi et al. [12] created a standard corpus for Malayalam-English to increase the sentiment analysis tasks in the code-mixed

contents.

## **METHODOLOGY:**

### **Data and Preprocessing Steps:**

The provided datasets are the collection of YouTube comments, and these YouTube comments are in five categories(positive, negative, {not-Tamil, not-Malayalam, and not-Kannada}, unknown\_state, and mixed\_feelings). The statistics of the datasets are tabulated in Table 1 and class-wise statistics are tabulated in Table 2. The datasets contain noisy text. So, we use pre-processing techniques before giving it to the model. The pre-processing steps are as follows.

- The first step is to stem and lemmatization the words and lower casing the words.
- removal of special characters and symbols.
- removal of repeating continuous characters in the word.

### **Dataset:**

The Tamil-English data set which was extracted from Tamil YouTube comments that contains three parts(Train, Validation, and Test).

The training, validation, and testing datasets have 35,656, 3962, and 4392 comments, respectively, with annotated labels.

The dataset consists of texts in five different classes as follows:

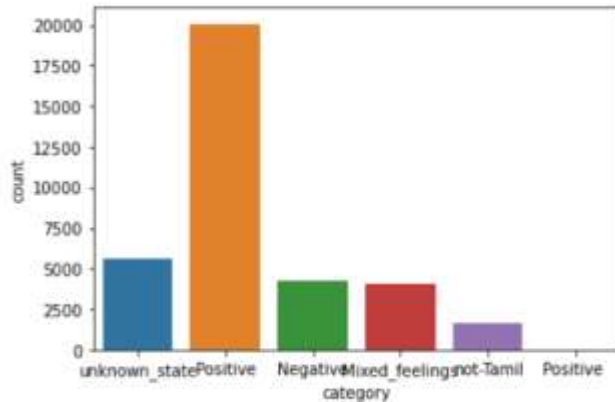
<b><u>Text</u></b>	<b><u>Label</u></b>
Vijay Annaa Ur Maasssss Therrrrrii	Positive
ayyayyo sruthihassan ellame poch	Negative
Idhu puratchi Padam ah flop confirm da	Mixed-Feelings
Waiting for this movie.....	Unknown_state

Subtitle me trailer dekhne wale like Karo	Not_Tamil
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**Dataset Description:**

Label	Train	Dev	Test
Positive	20070	2257	390
Negative	4271	480	315
Unknown_state	5628	611	288
Mixed-feelings	4020	438	71
Not_Tamil	1667	176	160
Total	35656	3962	4392

Several comments for each class in train, validation, and test sets.



Model:

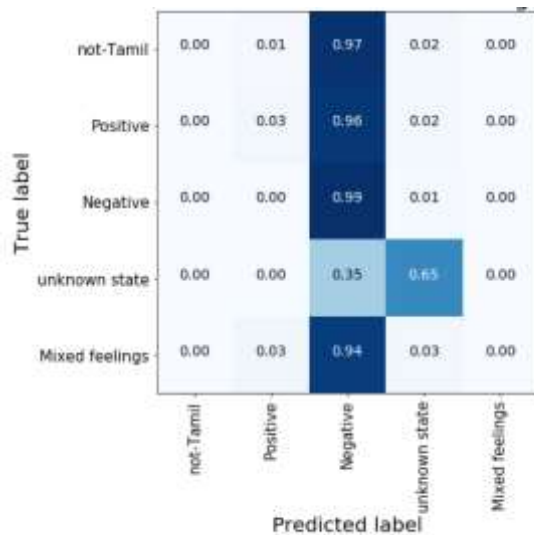
Here RNN embedding methodology is used to build the model in resulting the text classification task.

Parameters	Value
LSTM units	100
Dropout	0.2
Activation Function	Softmax
Learning Rate	1e-5
Optimizer	Adam
Loss Function	Cross-Entropy
Epochs	10

## RESULTS AND DISCUSSIONS:

We report precision, recall, and F1-score on the dataset. The label-wise precision, recall, and F1-scores for Tamil-English. we can observe that F1-score is the least for 'Mixed\_feelings' instances in the dataset. Confusion matrices are given for a better understanding of model predictions for the dataset. Labels are represented as (0-Positive, 1-Negative, 2-not Tamil, 3-unknown\_state, and 4-Mixed\_feelings).

Accuracy = (The Number of Correct Predictions) / (Total predictions).



In the beginning, we start with our BERT model and it doesn't perform well. It may have happened due to the lack of BERT multilingual-based model training in the Tamil language.

In the next step, We approached the problem with the RNN model, a deep learning technique. It is an effective deep-learning method that can apply to any task in NLP.

**Data Visualization:**

*Result of WordCloud implementation to visualize Positive comments in our dataset.*



## **LIMITATIONS:**

Although there are many advantages to Youtube comment text classification, there are certain difficulties as well. The unauthorized short form of words that are used in messaging texts which may cause inaccurate detection and classification of the text(comments).

## **CONCLUSION**

Classification of general events and detection of Sentiment of user comments on YouTube is a challenging task so far. A lot of work is done in this regard but still have a long way to go to overcome this problem. In this project, I have emphasized on following problems to find the polarity of comments given by the users of YOUTUBE.

- 1) Current sentiment dictionaries have limitations.
- 2) Informal language styles used by users,
- 3) Estimation of sentiments for community-created terms, 4) To assign proper labels to events,
- 5) Achieve satisfactory classification performance
- 6) Challenges involving social media sentiment analysis.
- 7) The dataset is not too clean. The proper way should be to tokenize it, exclude stop words and generate a bag of words from it.
- 8) Youtube comments can't be trusted as they can belong to any domain, and this text blob technique only gives polarity based on the text and not on the context of the video. For example, if the video is about a mobile phone review and the comment is „today is a wonderful day“ then this comment will get polarity 1 and be counted in the positive comment part. Whereas, these comments are not at all related to the review of mobile phones.

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# Application of Special Type Double Sampling Plan in Food and Safety Industry

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## **ABSTRACT**

*Statistical Quality Control is an important technique in production and maintenance of quality product in manufacturing environments. Reliability sampling plans are widely used in food industries to monitor the quality of products in order to safe guard both the producer and consumer and simultaneously reduce the cost and time of an experiment. Sampling plans are widely applied to make a decisions about the disposal of lots based on products under life testing experiment specifically in food and safety based items. In this paper, an attempt is made to study the performance of Special Type Double Sampling (STDS) plan in terms of quality maintenance in food industry. An algorithm is given for the evaluation procedure using Acceptable Quality Level (AQL) and Limiting Quality Level (LQL). A suitable real time applications are given for the plan parameters under the proposed study.*

**Keywords:** Acceptance Sampling plans, Inspection, Quality, Food and safety.

## **Introduction:**

Statistical quality control refers to the use of statistical tools in monitoring and maintaining the quality of products and its services. SQC involves different tools to analyze the quality of data under various real time problems. One of the most widely used techniques is acceptance sampling. The goal of the plan is to discover the plan parameters, such as sample size and acceptance number, in order to reduce the experimenter's cost and time. In an reliability acceptance sampling are studied, based on the lifetimes of the items observed on tests, or the number of failures observed during a pre-specified testing time, taking into account both the producer's risk and consumer's risk, and then a decision is reached to reject or accept the corresponding lot. Thus this plan considered two types of risks in which the consumer decides to accept or reject a lot of products shipped by the producer based on the inspection. The objective of these lifetime experiments is to set a lower confidence limit on the mean life. The number of failures recorded in the sample with size  $n$  throughout the designated time period  $t$  serves as the basis for the decision criteria. The lot is rejected if the measured failure rate exceeds 'c' (acceptance number), but otherwise accepted. The minimum sample size 'n' is reached in order to find a suitable experiment based on these criteria and the confidence limits.

## **Review of Literature:**

In 1969 H.F. Dodge and H.G. Romig were studied about Sampling Inspection Tables. J.M. In 1952 Cameron were studied about Tables for constructing and for computing the operating characteristics of single sampling plans. In 1984, Govindaraju K. introduced the Special Type Double Sampling plan. In 2013, S. Balamurali,

Muhammad Aslam and Mohammad Saber Fallah Nezhad studied about An Acceptance Sampling Plan under Frechet Distribution Assuring Median Life. In 2017, V.Kaviyarasu and V.Devika were studied about Designing of Special Type of Double Sampling Plan for Compliance Testing through Generalized Poisson Distribution. In 2018 Shakila Bashir and Mujahid Rasul were introduced a new distribution named as A New Weighted Rayleigh Distribution, Properties and Applications on Lifetime Time data. Further, In 2021 Kaviyarasu .V and Sivasankari .S has studied the single sampling plan under weighted Rayleigh distribution.

### **Weighted Rayleigh:**

The weighted probability distributions is studied to utilise when an investigator collects an observation by nature, according to a certain stochastic model. The collected observation may not have the original distribution unless every observation is given an equal chance of being recorded. Weighted distributions play a vital role in the studies related to medicine, ecology, reliability and human populations. Many noteworthy authors has contributed towards the concept of weighted distributions. The Rayleigh distribution introduced by Rayleigh in 1880 and it has appeared as a special case of the Weibull distribution. Rosaiah and Kantam has studied the Inverse Rayleigh Distribution in 2005, Tsai and Wu studied Generalized Rayleigh distribution in 2006, Patil and Rao have explained the importance of the distribution and its concepts of weighted distributions in 1978. Also Gupta and Keating, Gupta and Kirmani and Oluyede have worked on studying the importance of weighted distribution in various fields such as reliability, quality control, and biostatistics and wildlife population.

### **Food and Safety Industry:**

Food is one of the major necessities for a human being to survive. The nutrients we get from consuming food give us the energy and nourishment we use to sustain our daily activities. Whether you are a food supplier, a food business owner, a manufacturer, or a customer, you have a significant part in food safety. This aspect of the food and safety industry aims to **protect customers from food poisoning and foodborne illnesses that can affect human life** and business performance for establishment owners. Using statistical techniques for Food safety is an important aspect of food production and handling as it ensures that the health and safety of consumers are protected from any food-related issues. By applying such statistical quality control measures during food preparation, processing, storage, and distribution of the products in your food business, we surely avoid the issues that can affect the human life. **There are many statistical procedures that a company should follow to ensure their products are up to consistently acceptable standards and to keep consumers safe.** It is critically important that food manufacturers adhere to an efficient quality management system. Quality control is a process that identifies and rectifies any defects in finished products before they are shipped. It can be achieved by identifying and eliminating sources of quality problems during production to ensure customers' requirements are continually met.

### **Weighted Rayleigh Distribution:**

(Area Biased Rayleigh Distribution)

The probability density function of the Rayleigh Distribution is given by

$$(t;\sigma)=\frac{t}{\sigma^2} e^{-\frac{t^2}{2\sigma^2}} ; t>0,\sigma>0$$



While the cumulative distribution function of the Rayleigh distribution

$$F(t; \sigma) = 1 - e^{-\frac{t^2}{2\sigma^2}}; t > 0, \sigma > 0$$

Suppose T is a non-negative random variable with its density function  $f(t; \sigma)$ ,  $\sigma$  is a parameter, and then  $f_w(t; \sigma)$  distribution is a weighted version of  $f(t; \sigma)$  and is defined as:

$$F_w(t; \sigma) = \frac{w(t)f(t; \sigma)}{E[w(t)]}$$

Where  $w(t)$  is an arbitrary non-negative function.

For  $w(t) = t^\alpha$ , When  $\alpha = 1$ , it is called size biased and  $\alpha = 2$ , it is called area biased distribution according to Shakila Bashir and Mujahid Rasul . This paper made an attempt to study the Area biased Rayleigh Distribution in food and safety industry.

The probability density function of size-biased Rayleigh Distribution is

$$f(t; \sigma) = \frac{t^2}{\sigma^3 \sqrt{\pi}} e^{-\frac{t^2}{2\sigma^2}}; t > 0, \sigma > 0$$

Using above equations, the probability density function of the area biased Rayleigh distribution is given by

$$F(t; \sigma) = \frac{t^3}{2\sigma^4} e^{-\frac{t^2}{2\sigma^2}}; t > 0, \sigma > 0$$

The cumulative distribution of the ARD is

$$F(t; \sigma) = (2, t'), \text{ where } t' = \frac{t^2}{2\sigma^2}$$

Where  $(n, x) = \int_0^x t^{n-1} e^{-t} dt$

It is a lower incomplete gamma function.

### Design of the plan:

In a special Type Double Sampling plan the decision of acceptance is made only after inspecting the second sample. This aspect differs from the usual double sampling plan in which a decision of acceptance can be made even before the inspection of the second sample. The probability of rejecting a good lot is called the producer's risk ( $\alpha$ ) whereas the probability of accepting a bad quality lot is known as the consumer's risk ( $\beta$ ). The OC function of the proposed plan is given by:

$$L(p) = \sum_{i=1}^c \binom{n}{i} p^i (1-p)^{n-1}$$

In acceptance sampling schemes, producer and consumer are more conscious about the rejection of the good lot and acceptance of a bad lot. So, the producer wants the probability of acceptance should be larger than his confidence level  $(1 - \alpha)$  and consumer desires that the lot acceptance probability should be less than his risk  $\beta$ . Let  $p_1$  (Acceptable Quality Level (AQL)) be the probability of failure corresponding to the producer's risk and  $p_2$  (Limiting Quality Level (LQL)) is the probability of failure of the product corresponding

to the consumer's risk. We are interested to find four values of the plan parameters such that the following two inequalities should be satisfied:

$$L(p_1) = \sum_{i=1}^c \binom{n}{i} p_1^i (1-p_1)^{n-1} \geq 1 - \alpha$$

$$L(p_2) = \sum_{i=1}^c \binom{n}{i} p_1^i (1-p_1)^{n-1} \leq \beta$$

There are two types of risks always involved in any acceptance sampling plan

The OC function for STDS plan is designed and expressed as follows;

$$P_a(p) = P(d_1 = 0/n_1; p) * P(d_2 \leq 1/n_2; p)$$

Where  $d_1$  is the number of defectives found in the random sample of size  $n_1$  and  $d_2$  is the number of defectives found in the random sample of size  $n_2$  for the lot quality  $p$ .

### Algorithm:

In an acceptance sampling plan, the acceptance number which may ensures to satisfy the consumer and producer at certain level. According to Schilling and Neubauer [1980], a SSP with zero acceptance number are very useful in the area of compliance and safety related testing. By using Single Sampling Plan, we inspect a single sample from the whole lot, based on that single sample we cannot assure that, whether to accept or reject the lot. To overcome the pitfalls in SSP with smaller acceptance number. In a lot-by-lot sampling a new sampling plan was introduced as a Special Type Double Sampling (STDS) plan is used as an alternative to Single Sampling Plan (SSP). The advantage of using STDS plan is the decision made with the two samples. The plan providing one more chance to stand with the right decision. In the first phase of the sampling inspection the acceptance number are considered as  $A_c = 0$  and in the second phase the acceptance number is relaxed for the large sample size which may have  $A_c = 1$ .

The operating procedure of STDS plan under WRD is given below:

1. A random sample of size  $n_1$  units are taken from a lot and observed the number of defectives  $d_1$ . If  $d_1 \geq 1$ , reject the entire lot.
2. If  $d_1 = 0$ , select a second random sample of size  $n_2$  and observe the number of defectives  $d_2$ . If  $d_2 \leq 1$ , accept the lot. Otherwise reject the lot.

In Special Type Double Sampling Plan  $n_1$  and  $n_2$  denote the sample size. For the proposed sampling plan the probability of acceptance is given by

$$P_a(p) = (1-p)^{n_1+n_2} + n_2 p (1-p)^{n_1-1}$$

### Basic Quality Levels:

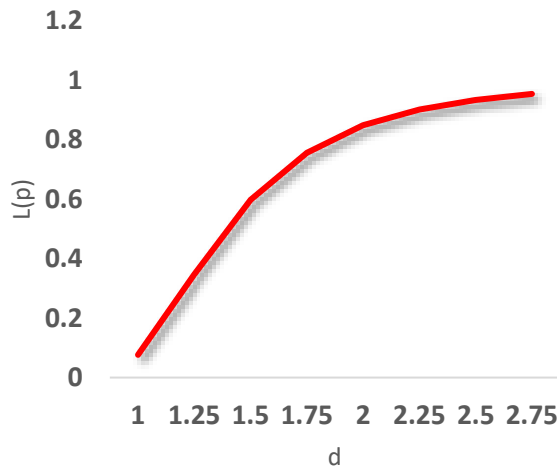
In this paper, the proposed sampling plan is called as Special Type Double Sapling (STDS) plan indexed through Incoming and Outgoing quality levels performed measures are indexed through Acceptable Reliability Level (ARL), Limiting Reliability Level (LRL) and Indifference Reliability Level (IRL). Thus the sampling plan characterized with the parameters  $(n_1, n_2, c_1, c_2, \delta)$ .

### Illustration:

Suppose that an experimenter is interested to implement a life test sampling plan for taking decision about disposition of lot of manufactured bread loaves packets whose

lifetime follows a Weighted Rayleigh distribution with the scale parameter  $\sigma$ . It is assumed that the mean lifetime of the product is at least 100 hours at the confidence level  $p^* = 0.90$ . He stop the testing at 70 hours under the condition of zero failure in the first sample and allows 1 failure in the second sample. It leads to the ratio  $t/\sigma_0 = 0.7$ . According to this ratio, the first sample size is 90 and second sample size is 34. Thus the proposed sampling plan is  $(n_1, n_2, c_1, c_2, \delta) = (90, 34, 0, 1, 0.7)$

$\sigma/\sigma_0$	1.0	1.25	1.50	1.75	2.0	2.25	2.50	2.75
L(p)	0.076	0.3468	0.5987	0.757	0.8488	0.9023	0.9345	0.9547



This figure shows when mean ratio attains 2.75 the curve reaches at most 1, hence the producer’s risk at this point is 0.0453 which is less than 5%. The minimum ratio of the proposed plan is 2.5643. This ratio infer that product will have an average life of 2.5643 times the specified average life of 100 hours in the above mentioned example with the probability of acceptance is at least 0.95.

**Execution of the Plan:**

The Special Type Double Sampling (STDS) plan under Weighted Rayleigh Distribution (WRD) consists of various plan parameters such as  $n_1, n_2, c_1, c_2,$  and  $\sigma$ . The probability of acceptance of a lot of LQL ( $p_2$ ) quality is restricted to a small value  $\beta$  and for protecting the producer an Acceptable Quality Level (AQL) is set up limiting the probability of rejecting a lot of quality AQL ( $p_1$ ) to a small value  $\alpha$ . plans are studied through the producer and consumer quality levels. Since performing a full inspection would be highly expensive, all damaging acceptance tests must eventually be performed using sample inspection.

In the food manufacturing industry, a company produces varieties of bread loaves through four bread-making machines. In this case, the producer monitors the sound wave of every bread-making machine. If there is no variation in these sound waves, then there are no defects. Suppose, there is a variation arises, some defects will be found. In this process, we use Weighted Rayleigh Distribution to analyse the variation in the sound

wave. In a batch of lots, we have to inspect each lot by using the Special Type Double Sampling plan to reduce time, cost and minimize the defects in both situations.

### **Conclusion:**

In this paper, we have proposed a Special Type Double Sampling plan for the truncated life test when the life time of the product follows a Weighted Rayleigh Distribution, since Rayleigh Distribution has been shown to be a useful model in the areas of quality control and reliability studies. To ensure that the life quality of product exceeds a specific standard, acceptance sampling plans based on mean can be used. In this study, a Special Type Double Sampling plan has been developed based on the mean of Weighted Rayleigh Distribution when the life test is truncated at a pre-determined time.

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# Change Leadership in Digital Transformation (DT)

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## **Abstract**

*Change is inevitable in today's digital world and for organizations to survive the digital onslaught, they must adapt in fast manner or else risk going out of business and to enable this, effective leadership, i.e., change leadership is the crucial factor. With ever changing digital landscape, comes the sense of urgency to adapt and take diverse stakeholders on the journey and ensure change is successful. Digital transformation journey needs to be articulated well, moderated carefully with utmost care and as much flexibility built-in as possible. Laying out milestones clearly, engaging multiple stakeholders, addressing their concerns, and getting their consensus on the journey are the crucial factors for success. A strong change leadership in place at multiple levels in organization working towards fulfilling common goals laid out will only be capable of delivering and surviving the digital onslaught.*

## **Keywords:**

Change Management, Leadership, Digital Transformation (DT) journey, Communication, Trust and Engagement, Clarity on DT changes, Adaptability, Skill Building, Digital Mindset, Sense of urgency

## **Introduction**

In the VUCA world, organizations face new threats to deal with and how best and fast they manage will determine their survival and growth. Especially with digital landscape changes brings new set of challenges to deal with and address and most crucial factor to be in place is a robust change management process and able leadership to manage them. The constant demands of changing environment, customer expectations, technological changes and along with it take the employees on this journey is an artform that needs proficiency and demonstrated repeatedly by the leadership, called as Change Leadership.

For any digital transformation to take place, the change leadership is must, and the process of transformation sets in when changes required are clearly articulated and communicated to all stakeholders and engaging them. The communication of change management is crucial piece to start with, wherein the message is propagated through usage of multiple forums within the organization so that all employees are aware off and know what is expected out of them and changes to expect. The transformation journey is quite arduous and daunting at times with all the pieces need to be systemically synchronized so that the result is delivered or else risk losing out in the daily muddle of things.

The leadership engagement is crucial, the need to understand the digital landscape and ability to see the big picture and articulate clearly the vision plays a significant role. The need to comprehend the technology stack, customer requirements and map those to the current capability of the organization will help in having clarity on the deliverables and preparedness of the employees to accomplish the tasks in front. The leadership which is

nimble and ears on the ground is better positioned to manage the things. Not only the C-suite, which is equipped to manage DT journey, the mid-level managers also need to be aligned and made partners in the journey.

After aligning the internal management, comes the process of truly articulating and laying out the journey to multiple stakeholders. The DT roadmap becomes the north star for the group and capturing as much details as possible in the journey map help in having clarity and removing the ambiguity on the journey. The roadmap is as good as the details contained in it, the more the better and with clear timelines of the targets to achieve, it becomes easy to calibrate progress and communicate to all stakeholders the progress and roadblocks.

The stakeholder management is crucial and necessity to ensure roadblocks are removed and buy-in from all the parties involved. The trust factor becomes the key driving force in this exercise and enables things move at a faster pace. There are potential landmines as leadership navigates the stakeholder management, sometime reluctance to adapt and resistance to proposed change from few stakeholders who think they are going to get effected hampers the progress and potential to derail the journey. The skilful tackling of these pockets of resistance and quickly settling them is a crucial test for leadership skills and plays a key role on the DT journey.

The last piece of the DT journey is review with stakeholders on continuous basis, where in the targets or goals set are reviewed in-depth and analysed. The wins call for celebration and misses are closely scrutinised and analysed, and lessons learnt, and remedial measures put in place. Often it not the failure of the plan, it is more often the external elements changed so rapidly that initial plan looks redundant and calls for going back to drawing board and come up with fresh set of targets and plan relevance in the changed context.

Overall, the Digital Transformation (DT) journey is combination of multiple factors in play, only able and experienced hands can skilfully navigate the journey. The need to assimilate the changes, articulate them to diverse stakeholders, customers and employees are all part of the process and incorporating the continuous learning on the go makes the journey quite fascinating and fruitful.



Fig 1: Change Leadership in Digital Transformation (DT)

### Change Communication in Digital Transformation (DT):

The change communication is crucial aspect to start the DT journey and comprises of five steps taken up in orderly manner. The first steps comprise of sprucing of Culture of the organization where in some fundamental changes in the way things happened so far will see some radical change or completely abandoned altogether. The need to usher new culture is as good as altering the basic DNA of the organization. Sometime things worked in certain fashion and produced results, but holding onto them no longer produces results, rather causes deceleration.

The second step is of building an agile organizational design where in flat hierarchy is the norm and dismantling old and complex bureaucracy is the key. The nimbler the organisation design is, the better the scope to experiment and make changes swiftly. The design should be robust so that dramatic changes in the environment should be absorbed without the need to revamp or redesign repeatedly.

The third step is to articulate the Digital Transformation (DT) journey clearly laying out the milestones and propagating the message through all stakeholders in the organization. The more granular the plan is, the better it is for the target group of change associated with can pick up and action upon it and helps in clearly establishing the RACI (Responsibility, Accountable, Communicated, and Informed).

The fourth step is to communicate the DT road map and changes to all levels in the organization using multiple forums, be it social, internal messaging systems, informal and formal settings and the choice of platforms should be in such a way that two-way communication is possible, so that feedback is given and taken and acted upon. The open communication helps in removing the anxieties of the employees as well and provides them a platform to share and care.

The fifth step is that of continuous engagement, it is not just plans are rolled out, hype created around it and left that way. The journey is only successful as good as the participation is and robust feedback loop mechanism built in. All stakeholders are informed on the progress and feel engaged so that overall, the sense of belonging in the journey is instituted organization wide and is crucial for the success of DT.



Fig 2: Change Communication in Digital Transformation (DT)

### **Leadership Role in Digital Transformation (DT):**

The leadership plays a pivotal role in the entire process, the more able and experienced the C-suite is, the better the chances of execution of transformation. The most important part is understanding the various elements of VUCA world which will have direct bearing on working of the organization and how to ingress and digress from those elements is crucial.

The clarity with which the vision is articulated by the leadership, the better the chances of relating to them by the workforce at the base of the pyramid and this helps them to relate to the journey and be more enthusiastic in participation of DT journey. The change of mindset from employee to that of Entrepreneur does the trick in ensuring more wholehearted participation, as there is fundamental change in the thought process and along with the reward systems should also be designed to encourage and nurture that spirit.

The “Digital Mindset” is crucial where in the organization is thinking of digital adoption and totally embedded in digital thought process makes progress easy as the tools and techniques to a certain extent are known to the workforce and adaption becomes easy and for all the above pieces to fall in place, the leadership needs to be quite articulate and address these on regular basis on various forums and keep the momentum going.





Fig 3: Leadership Role in Digital Transformation (DT)

### **Laying out the Digital Transformation (DT) Journey:**

The next step is ensuring DT journey map is there where in the roles clearly defined and actors identified, and resources allocated. As it involves multiple stakeholders coming together to execute the project, the scope and responsibilities are clearly laid out and known to the parties involved. For example, role of leadership (discussed previously) and organizational changes (discussed in first topic) are essentially an iteration as without those elements no road map is complete

The other important three aspects worth dwelling upon are, Customer Focus: the customer is the centrepiece of any digital transformation journey, and it is better to gain insights on customer experiences and work towards plotting the change. Does the customer business require change in the product mix in wake of rapid environmental changes? What to continue and what to discard, sometime customer knows it better and we will only be helping in getting that clarity and worthwhile suggesting changes as well and all these will lead to better customer experience.

The other focus should be Technology changes and the effect it is having on the current state of technology stack in hand both for internal and external parties and weeding out legacy and costlier options and bring in state of the art technology for use in cost effective manner. The crucial aspect is Strategy Changes, the most important part C-suite spends most time in answering.

The strategy changes can either mimic short term or long term based on the need to change, and it is always important to make tweaks in the strategy based on the progress made and the pace of adoption. The strategy shift cannot be dramatic in nature or else the whole purpose of strategy exercise becomes redundant as they are in the first place are clearly thought out and have future looking aspects. For the success of Digital Journey, the need to lay out these elements shown below are crucial for success and progress.



Fig 4: Laying out Digital Journey

### **Gaining Trust and Engagement in Digital Transformation (DT) journey:**

The point of gaining trust and engagement cannot be over emphasised as this is utmost required for successful completion of any DT journey. The trust factor is particularly important aspect, as we keep saying multiple stakeholders and their engagement is crucial. The relevance of it will be much apparent when things started moving on the ground and teams are busy in executing the change, but when things don't go the way, they are planned, that is there the whole issue of trust and engagement skeletons tumble out and quite drain on management time to fix these issues which are there at the start of the journey but broken during journey.

The reason for fault lines lay in details, while execution takes priority as the DT journey progresses, often things are taken for granted and not nurtured, one example is regular communication between important stakeholders broken and not informed about latest progress and roadblocks. Only when things reach to a state of collapse, which is where attention of key stakeholders is called out and is not good for progress of DT journey

There are multiple elements which are either deeply embedded in maintaining the trust and engagement factors, some of them are peripheral in nature but have role to play. Example Human Resources-HR should be deeply embedded in DT journey right from the beginning as they do lot of heavy lifting in engaging the employees at the beginning and similarly the need to change mindset of employees and address their concerns and anxieties regarding the transformation.

The need to engage the customers in the journey also plays a crucial role and provides clarity on journey and futureproofing and retention as well. The clear the expectations and changes from customers and employees' point of view helps in clarifying what is working and not.



Fig 5: Trust and Engagement in Digital Transformation Journey

### Clarity on Digital Transformation (DT) Effects

The DT journey is as good as the elements embedded in it working in a coordinated manner to ensure desired results achieved. The journey is said to be completed or reaching a steady state when key targets planned are reached and results are visible both internally and to customer as well. One of the key outcomes of DT journey is, transformative leadership now in place where they are fully aware of the journey, navigated the pitfalls and developed the ability to make changes rapidly and align organization to the external threats and are quiet future looking in approach, digital savvy and quite initiative taking in resolving the issues.

The organization now runs on certain characteristics like “Digital Ready” workforce who are aware of technology, ready to learn and adapt and few things like agility in performance and customer becomes the centre piece in their actions. For organization to benefit in long term the effects of digital transformation journey, it becomes important to preserve the culture and changes achieved through hard and meticulous planning and not to let the guard off and the true value and benefits can be reaped only by sustaining and delivering consistently.

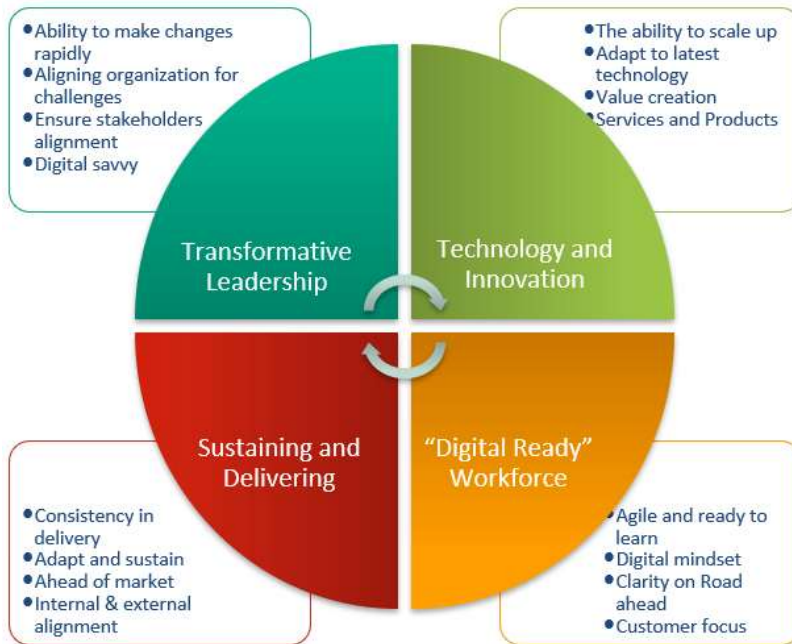


Fig 6: Clarity on Digital Transformation (DT) Effects

## Conclusion

The Digital Transformation journey is multi-faceted and requires careful examination from all angles and well-structured and quite meticulous so that key stakeholders are in sync all through the journey and requires constant monitoring and review on regular basis. The benefits of transformation are quite lucrative, with various external parties, e.g., Governments, Competitors, Academicians, consumers, are quite interested in following the journey closely. There is no perfect fitment plan or strategy that fits all and opportunity to do further research on multiple facets of the Digital Transformation journey exists.

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## Consumer purchase behaviour towards green products

Ms. Ashwini S.V.

Under the guidance of Dr. Sugant.

### ***Abstract***

*Due to the rise of environmental consciousness, consumers tend to pay more attention to the safety of personal care items and the products with an environmental benefit*

*Environment friendly increase green living that help to conserve energy and also prevent air, water and noise pollution. They prove to be a blessing for the environment and also prevent human health from deterioration. Government has introduced policies to save the environment from further degradation and so has the corporations opted for environmentally friendly practices.*

*In the recent years consumer awareness has been increasing about green products and green brands.*

*The main objective of this study is to observe how green products influence consumer behaviour and brand evaluation, and to identify the relative importance of product features used by consumers when evaluating and buying cosmetic products.*

## Environmental friendly and sustainability in procurement and sourcing for information technology.

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### **Abstract:**

- *Environmentally friendly and sustainable procurement is a vast topic and has the following topics that are very important. Cleaner production Clean energies from wind, water, solar and biomass. Importance of Biofuel policies. Purchasing and supply management: Past, present and future methodology of purchasing and supply management. Performance of traditional procurement talks about time and cost indicators, quantifying risks and functional positions. Project management: discuss Continuous & normative occupation, leadership style and effectiveness. Energy economics: study of smart cities and good living conditions, nonlinear renewables and carbon envision efficiency.*

- *The purpose of the research is to use sustainability in procurement and sourcing. Procurement -Procurement is the process of buying goods or services for a business, and it usually refers to expenditure. Preparation, solicitation, and payment processing are all aspects of business procurement, and they typically include multiple departments within a corporation. Depending on the procurement demand, procurement charges can be divided into many categories. Most large-scale procurement processes involving several bids includes competitive bidding. The management of procurement and procurement processes can consume a significant percentage of a company's resources. Procurement budgets often provide managers a certain amount of money to spend on the items or services they require.*

- *Sourcing, sometimes called procurement, is the process of locating and selecting firms or persons based on predetermined criteria. In business, sourcing is done in a variety of ways and for a variety of purposes. Supply chain management is one of the most common applications of sourcing. Businesses who can discover the best suppliers at the best prices can gain a competitive advantage. Sourcing is a subset of recruitment that involves proactively seeking for the best applicants for a specific position. Outsourcing is a widespread business practice in which a company contracts out a non-critical business function, such as payroll, to a third-party supplier. Businesses will compile a list of potential third parties as part of the outsourcing process and select the best one.*

- *Now using sustainable methods in procurement and sourcing in the field of information technology, to use the technology for a prolonged period of time with making as minimum changes as possible by spending lesser in imbibing the newer technologies and at the same time keeping in mind the environmental effects it has while changing over from technology to newer technology.*

- **Keywords:** Concept of sustainability, Supply chain, network, ethical, purchasing, sourcing, stakeholders, supply chain management, research, product life cycle, Internal

cooperation, supplier management, cluster analysis, environmental management, materials, procurement, performance measure, services.



## Predictors of Entrepreneurs Orientation among Women: An Empirical Analysis

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### ***Abstract***

*Entrepreneurship is considered as a key driver of financial development, employment creation and aggregate development of a country. This study investigated the role of knowledge, social support, psychological support and financial support in promoting entrepreneurial orientation among women. The results confirmed that social support, knowledge, financial support and psychological support significantly promote the women entrepreneur's performance.*

**Key words:** Women entrepreneurship orientation, social support, knowledge, financial support and psychological support.

# The Implementation of Digital Marketing Strategies by Healthcare Organisations to augment the reach of online Healthcare Platforms.

By

**Rahul P R<sup>1</sup> and Dr. Shamal S<sup>2</sup>**

1. Rahul P R – Research Scholar, CMR University
2. Dr. Shamal S – Assistant Professor, CMR University

## **Abstract**

*The technological evolution in the society and in the consumer behaviour has inevitably affected the healthcare organisations by creating significant changes and imposing healthcare platforms as an indispensable part of healthcare business. This evolution in digital platforms made healthcare organisations to focus on increasing the reach to the clients across borders without having any physical presence. The advancement and dependability of society on digital and online platforms made healthcare organisations to move on to digital interfaces to provide better healthcare through online platforms for appointment bookings, doctor consultations, medicine purchases, health check-up scheduling's and reports downloading etc.. As digital platforms became the core of healthcare industry the competition amongst organisations increased and the main agenda of the companies turned towards flourishing and promoting their online platforms. As these online platforms are in-essence digital platforms, the healthcare organisations created significant changes in marketing framework by inducing digital marketing into the marketing strategy process. This study focuses on the implementation of widely and conventionally accessed different types of digital marketing strategies and tools used by healthcare organisations to augment the reach of online healthcare platforms which are exceptionally effective and efficient. The results obtained provides healthcare organisations an in-depth knowledge about the most effective and efficient digital marketing tools and strategies that are commonly used and have the best potential to enhance the digital platforms reach. The results assists healthcare organisations to determine to what extent and which digital marketing strategies are better suited for increasing the performance and reach of organisations healthcare platforms.*

## **Keywords**

Digital Marketing Strategy, Healthcare Organisations, Digital Platforms, Online Marketing, Digital Marketing Tools.

## Digital Search Advertising – The role of post-click factors in generating purchase conversions

**Amit Kishore**

**Abstract:** Search advertising is one of the most popular forms of digital advertising and a lot of study has been done on various aspects of search advertising. While a lot of focus so far has been on consumer behaviour leading to the click on the ad. All these studies, therefore, treat a click on the search ad as a binary event. Today, there is enough data available that allows us to capture post click behaviour of a single consumer clicking on multiple ads within a campaign.

This paper tries to look beyond the binary value of the click to study the subsequent actions taken by a user post clicking on a search ad, referring to those set of actions as the depth of interaction. The aim of the paper is to test if the depth of interaction is better able to predict the final outcome and identify those post-click factors that may have a better correlation to the final sale/conversion. A prescriptive research design was used in the study with a sample size of 100 randomly selected users, to model their exposure to the banner ads during the campaign, employing binary logistic regression analysis.

The results indicate that the depth of interaction is able to predict the outcome significantly better than just the clicks. There is a significant jump in the accuracy of the model when independent variables representing depth of interaction are taken into account. This shows that the depth of interaction is better able to predict the final outcome as compared to just the click data.

**Keywords:** Digital search advertising, text advertising, depth of interaction, conversion funnel, sales conversion, logistical regression

## “Impact of Electronic word of mouth on customer purchase intention in health care services”

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Dr. SHAMAL S<sup>2</sup> Assistant Professor SOM CMR University.

**Abstract:** *Electronic Healthcare Technology and Services are widely used around the World, and it has enormous potential to enhance Clinical Results and change the way treatment is delivered. Electronic Word-of-mouth (eWOM) Influences the Behaviour of the Customer to change the purchase decisions of Health care Services more efficiently through online References. Consumers' attitudes toward the Review and Health Care Services, Perceived Source Reliability, and Purchase Intention are all influenced by online Consumer Reviews. The purpose of this study is to Understand the Impact of Electronic Word-of-mouth (eWOM) on the Health Care Industry. The study used a Review of Literature as the Research method to explore the Role of different Factors leading to Customer Purchase Intention in Health Care Services earlier Studies Revealed that there is a Significant Relationship between Review-generating factors (prior factors that motivate users to post reviews) and Impacts of eWOM (impacts caused by online reviews) from a Consumer and Company Perspective. In addition the present study will be a guideline to the health care industry to enhance their service satisfaction level among the customers.*

# Consumers Adoption of Fitness Wearables: A Conceptual Understanding from a Growing Economy

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## Abstract

Wearable devices have emerged as rapidly developing technologies that have the potential to change people's lifestyles and improve consumer wellbeing. However, the adoption of these devices has been in the nascent stage when compared to mainstream technologies such as smartphones and tablets. Therefore, it is becoming increasingly imperative for manufacturers and marketers to comprehend the driving forces behind the adoption of fitness wearables. This will help them to improve the features and desirability of these devices in order to attract the customers. The primary objective of the present study is to identify the influential factors in the consumers' adoption intention of fitness wearables. The study uses review of literature as the research method to explore the different dimensions in consumer adoption of fitness wearables. Using various ideas and approaches, researchers from a range of fields have examined how consumers are embracing wearable devices. The outcome of this study may also provide marketers and managers of wearable technology some significant guidelines for formulating strategies for promoting and marketing fitness wearables profitably. In addition, this research may be hopeful to provide a novel and multi-attributes perspective for future research.

## Keywords

Wearable technology, fitness trackers, adoption intention, health consciousness, health; privacy; consumer attitude; perceived value

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## Personal Investment decision in selected financial and non-financial assets- “A study on small and medium entrepreneurs in Bangalore”.

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Dr. RAJEENA SYED, Research Supervisor, CMR University, Bangalore

**ABSTRACT:** Investment ~~is a~~ very important decision which can have some impact ~~on the life~~ ~~on~~ life of investors. Immense knowledge about the different avenues for investment, risk and return associated with each investment ~~avenue~~ ~~avenues~~ and reasons for investments are important factors to be considered before considering investments. Is investment for higher return? If yes are you ready for bear risk of investment, so are the returns on investment, every investment regardless equity shares, precious metals or real estate, has some risk associated with it, an investor should have lot of patience to get benefited from their investment.

This paper examines women entrepreneurs Investment decision on equity shares, real estate and precious metals as they are the best decision makers when it comes to investment precious metals, they consider investment for future of family and children, they prefer minimum risk and stable returns for their investment, every investment decisions made by them are influenced by their family and friends which may be positive or negative, lot of financial literacy is lacking in women as they are made to feel inferior by the other section of society.

**KEYWORDS:** Investment decisions, Investment avenues, women entrepreneur, Equity shares, Real estate, Precious Metals.

**INTRODUCTION:** Investor is a person who ~~buys~~ ~~buy~~ or ~~sells~~ ~~sell~~ any Financial and Non-Financial assets for return and ~~bears~~ ~~bear~~ risk for such returns, he is a person who allocates his/ her hard earned money to gain additional Income and with expectation of multiplying the Investment. Investment decision is a process of allocating the hard earned money of investor with expectation of return for such allocation over a specific period of time, According to Global Alliance for Micro, Small and Medium enterprises ( GAME)- an association for micro small and medium enterprises said that in India women entrepreneurs are restricted as more than 80% of the ventures depend on family funds to start the business. In a recent study conducted by GAME about 80% of the ventures are solo owned and about 86% of them are self funded due to which they are restricting themselves from making any investment decisions.(1)

In another study of ‘India Brand Equity Foundation’ article women entrepreneur shaping the future of India published on Jan 4th 2022 about 20.37% of women are MSME owners i.e about 13.5-15.7 million women owned ~~businesses~~ ~~business~~ which provides direct employment to millions of people. Women entrepreneurs ~~contribute~~ ~~contributing~~ about 3.09% of India’s total industrial output of which textile industry is important sector operated by women entrepreneurs. post covid the investment pattern of people has drastically moved towards investment for health, future returns, safety and security of investments. due to the underlying cause women entrepreneurs investment preferences

changed to few selected financial and non financial assets which are presumed to be safe and give good return. (2).

Shares are the unit or ownership in a company where the investor invests their money for some return and get share in the residual profits of a company, the equity shares are major part of shares. The return on share depends on market condition which fluctuates based on many

factors. Investing in shares requires extensive knowledge of market, risk associated with each shares which varies every second, knowledge about company where you want to invest, risk

bearing capacity of women investors etc as shares are high risk bearing investments.

Real estate includes any land and land form, which is one of the oldest form of investment.

Precious metals are most important and preferred avenue to invest by most of the women investors it is age old tradition of investment as investment on precious metals is safest and returns on these multiply in short span of time again depending on market condition.

The most important part of preferred precious metals are yellow and white metal i.e. Gold and Silver as they are considered liquid assets and low risk high return investment. They can easily be purchased and sold for good returns.

**Review of Literature:** The most important factor considered by women entrepreneur investment decision are risk and returns, as most of the women investors prefer safe and stable return on their investment.

**Sagar Patil, Virupaxi Bagodi (2021):** Discuss that investors decision to invest in any company depends on insider information and recommendation, corporate earning capacity, financial advisor and expert advice is of less importance as investors decision to invest depends on their risk bearing capacity.

**Akshaya Babu, Anbu Selvi, Benadicta Felci Louis (2019):** Discuss the perception of investors on investment decisions, it is shown that only some percentage of investors are aware of different investment avenues. Even if they have some knowledge they are hesitant to invest in financial instruments.

**Jeet singh and preeti Yadav (2016):** The study shows investors consider Dividends paid by the company while investing on equity they look for efficiency and capacity of management and take recommendations from stock brokers or expert to invest in equity shares. While females mostly go for friends and relatives for advice and they prefer safety and security for investment.

**Malabika Deo and Vijayalakshmi Sundar (2015):** The study focus on psychology of individual investors in making investment decisions. The most important factor influencing their decision are financial requirements, advice, recommendations, firms image, share price, etc. the investment decisions are also based on gender, demography and age

**Manoj Kumar Dash (2010):** Study on factors influencing investment decision making process among men and women under different age groups, investors use some source or expert opinion for investment decisions, accordingly risk averse investors prefer government schemes and deposits for safe investment

**Research Methodology:**



**Research design:** A study follows descriptive research methodology based on which a questionnaire was constructed and administered to women entrepreneurs.

**Sampling Technique:** The convenient sampling technique is adopted for the study.

**Sampling Units:** Women small and medium scale entrepreneurs of Bangalore are the sampling units for study.

**Sampling size:** 20 women small and medium scale entrepreneurs are selected conveniently as respondents for study.

**Tools for data collection:** A structured questionnaire was prepared with open and close ended questions for collection of data.

**Sources of data collection:**

- **Primary source:** Direct responses were collected from the respondents through questionnaire.

- **Secondary source:** Books, Journals and Internet were used for collecting secondary data.

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**Research Objectives:**

- To know the factors influencing investment decision of women small and medium entrepreneurs.

- To explore the reasons for investment made by women small and medium entrepreneurs.

- To find which avenue women small and medium entrepreneurs prefer the most for investment.

- To determine level of financial literacy and its influence on investment decision of women small and medium entrepreneurs.

**Research Problem:**

In India, women investors have minimum knowledge about the avenues available for investment because of which women prefer traditional method of investment i.e. investments in precious metals, real estate, chit funds, the return on such investment is low when compare to investments on mutual funds, equity shares, digital currency and coins etc

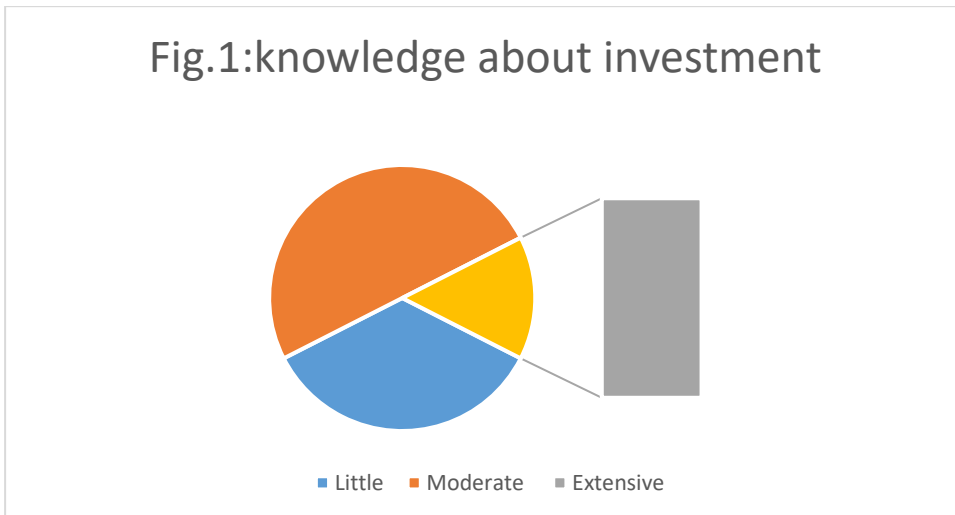
This study is an attempt to know the investors preference for investment, risk bearing capacity of women small and medium entrepreneurs, factors influencing investment decisions of women small and medium entrepreneurs and to know the level of financial literacy they possess on various investment avenues.

**Perception of women small and medium entrepreneurs on Investment decision of various investment avenues (equity shares, real estate and Precious metals)**

**Table.1: Knowledge about investment:** Most of the women small and medium entrepreneurs have moderate knowledge about investment avenues as most of the investments are done by male of family, about 35% of them have very little knowledge about investments, and without basic knowledge about investment it will be difficult to make any decision regarding investments.

Particulars	No. of respondents	percentage
Little	07	35

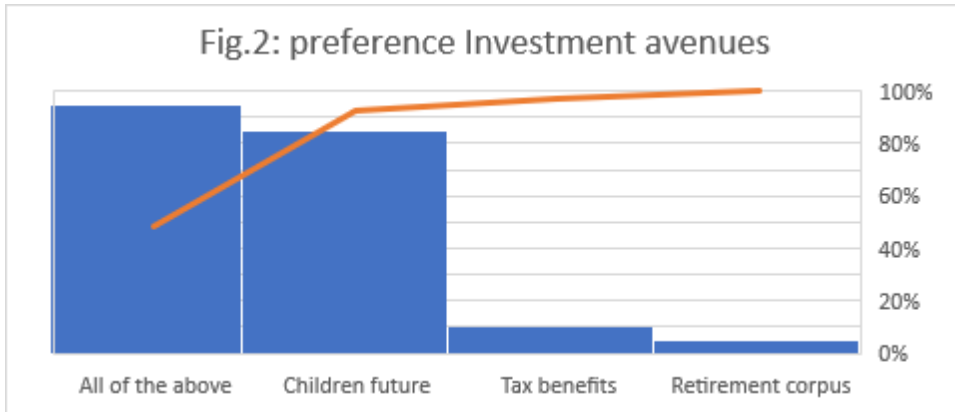
Moderate	10	50
Extensive	03	15



**Table.2: Preferred Investment Avenues**

Women small and medium entrepreneurs prefer precious metals and real estate for investments as it is safest and high return avenue, about 45% of women entrepreneurs go for precious metals as it is conventional and also practiced over generations, precious metals are liquid asset which is also one of the important reason to invest..

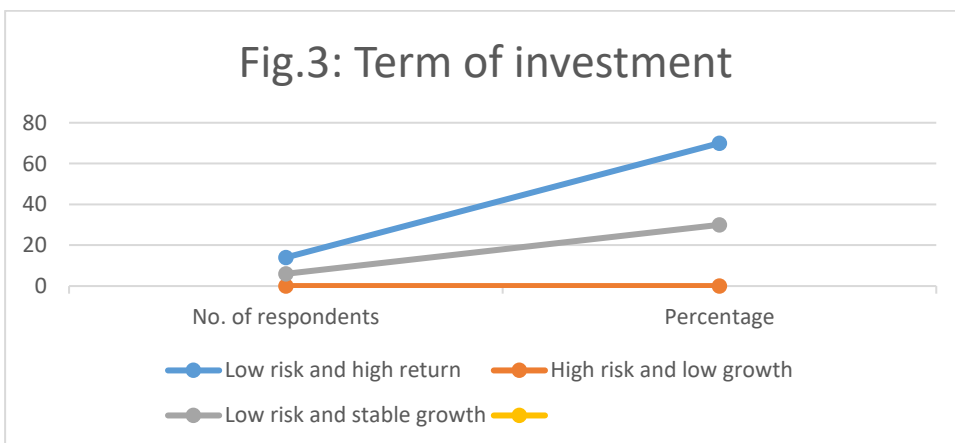
Particulars	No. of respondents	percentage
Equity Shares	03	15
Real estate	07	35
Precious metals	09	45
All of the above	01	5



**Table.3: Terms of Investment**

About 50% of women small and medium entrepreneurs prefer open term for investment to have all time access to their investments rather than fixing the investment to specific period of time.

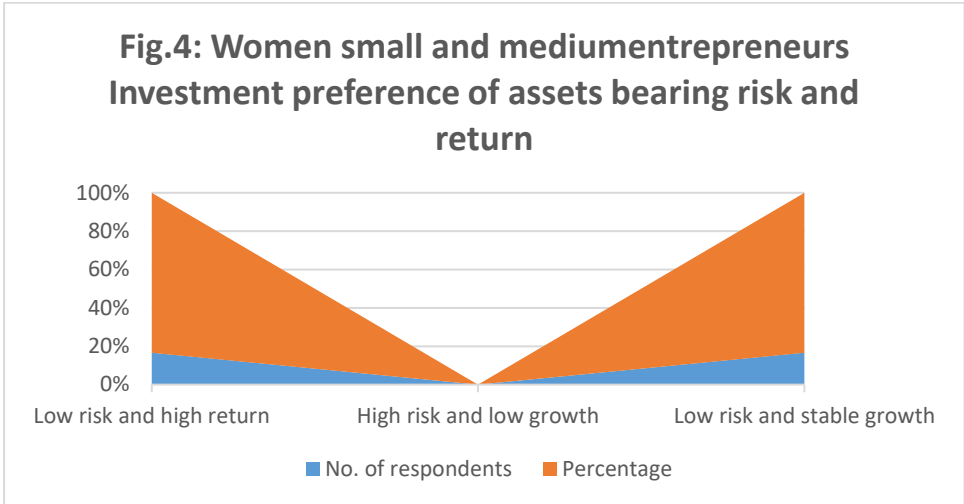
Particulars	No. of respondents	Percentage
0 – 5 years	05	25
5 – 7 years	02	10
Up to 10 years	03	15
Open term	10	50



**Table.4: Women small and medium entrepreneurs Investment preference of assets bearing risk and return.**

Women investors are risk averse they prefer low risk for return, about 70% of investors never want to take risk even if there are returns associated with it, about 30% of women investors rarely take risk for returns.

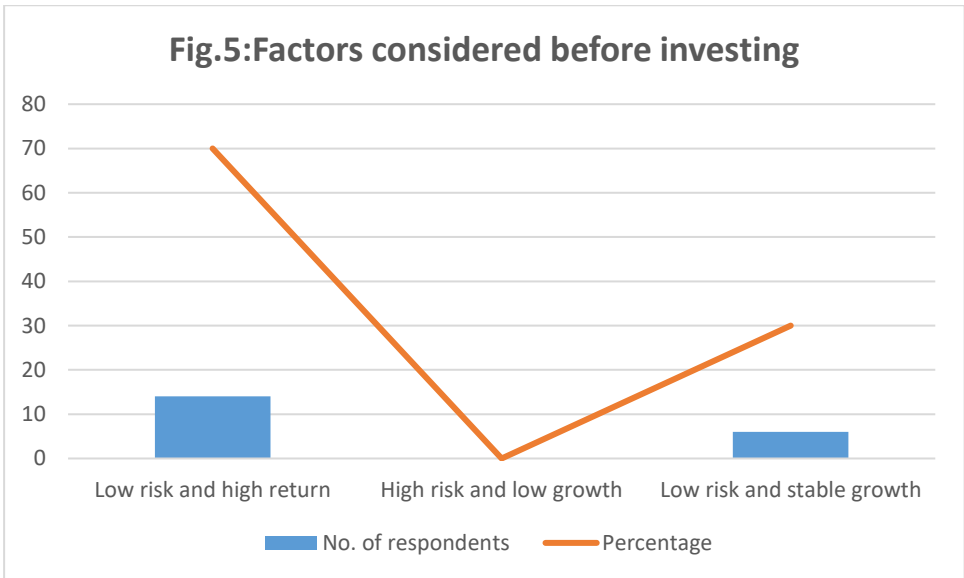
Particulars	No. of respondents	Percentage
Always	0	0
Rarely	06	30
Never	14	70



**Table.5: Factors considered before investing.**

When it comes to investing hard earned money women small and medium entrepreneurs prefer low risk and high return investments rather than high risk low growth investments. About 30% go for low risk and stable growth with that it is clear that female investors are reluctant to take risk.

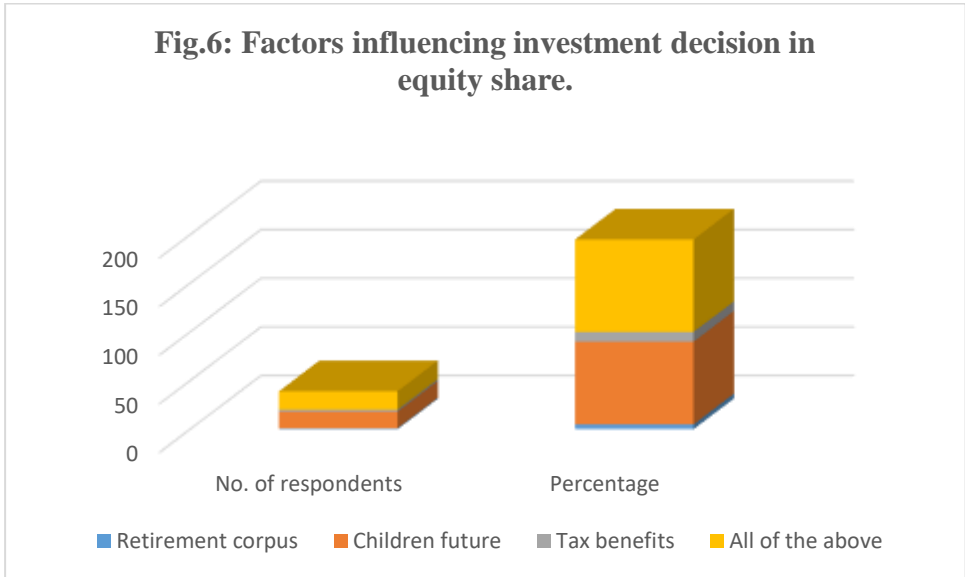
Particulars	No. of respondents	Percentage
Low risk and high return	14	70
High risk and low growth	00	00
Low risk and stable growth	06	30



**Table.6: factors influencing investment in equity share.**

Most of the women small and medium investors prefer investing in equity shares if there are high dividends paid by the company, [the reputation](#) of the company is good in the market, and also based on the recommendation of market experts only 5% of [investors](#) prefer investing in equity for high dividend.

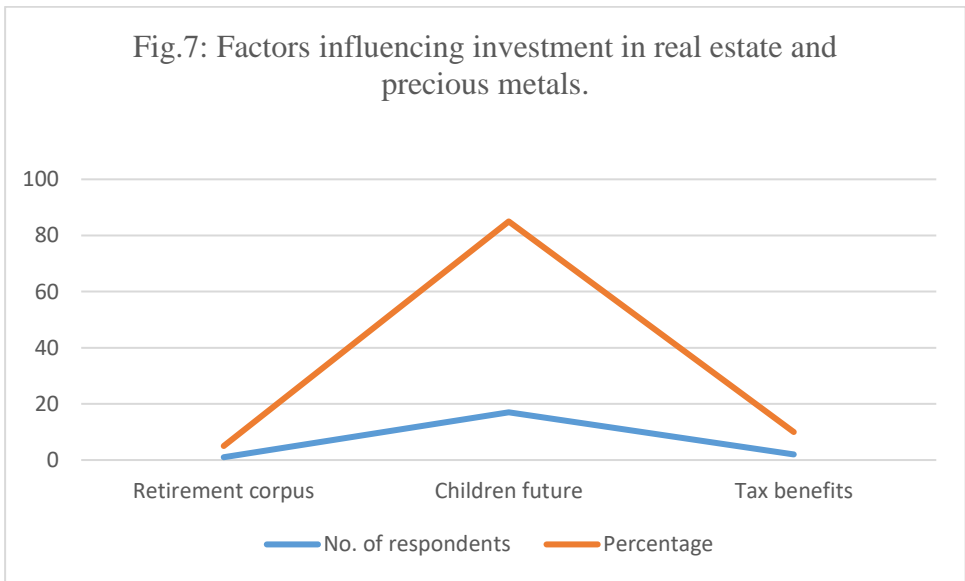
Particulars	No. of respondents	Percentage
High dividends	01	5
Company reputation	00	00
Recommendation from expert	00	00
All of the above	19	95



**Table.7: factors influencing investment in real estate and precious metals.**

Women investors mostly invest in real estate and precious metals for its safety, low risk and good returns. There is very minimal risk involved in this type of investment.

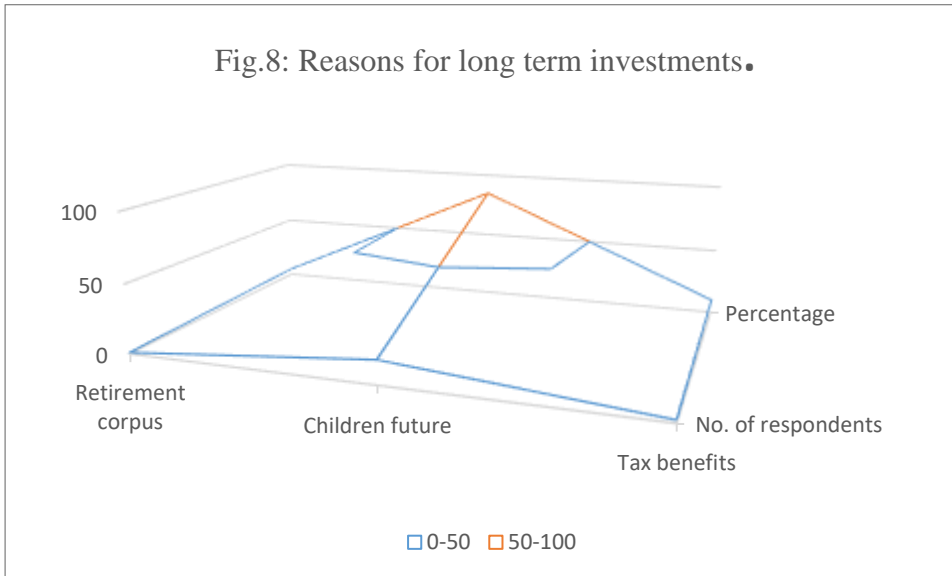
Particulars	No. of respondents	Percentage
Safety and low risk	01	05
Good returns	01	05
Both a and b	18	90



**Table.8: Reasons for long term investments.**

Women small and medium entrepreneurs invest in any of the avenue for low risk and good return, to secure their retirement, tax saving and children future, almost 85% of female investors invest for children future as the returns from investment can be saved and used for children future.

Particulars	No. of respondents	Percentage
Retirement corpus	01	5
Children future	17	85
Tax benefits	02	10



**Limitations:**

- The study is limited to only 20 women small and medium entrepreneurs as respondents in Bangalore
- The study was restricted to women small and medium entrepreneurs in Bangalore.

**CONCLUSION:**

Women are the best decision makers as they have lot of patience which means they are ready to wait for their investment to grow, with very less knowledge about avenues of investment and working of financial markets, women entrepreneurs prefer age old traditional investment avenue of investing in real estate and precious metals as they consider it safe and secure with good return, precious metals is most important avenue where most of the women investors invest as they are liquid asset (can be converted to cash in short span of time). The investments made by women entrepreneurs is for the future of their children. There should be some efforts from the government to educate women investors about investments and its benefits as most of the women of our country are financially illiterate.

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## Psychological biases of women investors in Mutual fund industry

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### **ABSTRACT**

*The theme of financial investment is of grave concern as the probability of psychological bias and the existence of huge financial risk. In financial investment, decision making is very important for individual investors to be conscious with their personality traits due to the chance of occurrence of psychological biases.*

*Mutual funds have unlocked different vistas to lots of small-scale investors with the advantage of advanced technology. The success of mutual funds is basically the outcome of the mutual efforts of skilled fund executives and attentive investors.*

*Nowadays, women not only take the home-oriented decision but also take financial decision independently. Due to higher qualification women own, they are enjoying higher post whether it is in corporate or other services. Today's women are financially independent and ready to pool their savings in a profitable avenue to maximize their wealth.*

*The study is an overall attempt to analyse the psychological biases of women including various aspects such as the confirmation bias, anchoring bias, availability bias, etc. in Mutual fund industry.*



# Update or Outdate- Threat to Investors for long term in Globalisation

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## ***Abstract***

*Invention or Innovation always lead the market and replace gradually in the life cycle of business or Education. But now days present changes and creation of new markets happening through disruptive innovation. Changing new modern technology is crossing all the barriers and ethics and creating its own way by replacing the new technology. Business became so danger that the product life cycle can't be estimated due to disruptive technology.*

*Hence, it is became the threat to the business community or new entrants to investfor long run due to the threat of disruptive innovation. As in the new technology product features, price, flexibility, adaptation, portability, portability is high there will be no permanent guaranteed loyal customers for any business.*

*This paper tries to create the awareness for the investors to analyse properly before investing a long term huge investments.*

**Keywords:** Disruptive innovation, business, investment, product, technology, invention.

## **1. Introduction**

A disruptive innovation is an innovation that creates a new market and value network and eventually disrupts an existing market and value network, displacing established market leaders and alliances. The term was defined and phenomenon analyzed by Clayton M.Christensen beginning in 1995. More recent sources also include "significant societal impact" as an aspect of disruptive innovation.

Not all innovations are disruptive, even if they are revolutionary. For example, the automobile was not a disruptive innovation, because early automobiles were expensive luxury items that did not disrupt the market for horse-drawn vehicles. The market for transportation

essentially remained intact until the debut of the lower-priced Ford Model T in 1908. The

mass-produced automobile was a disruptive innovation, because it changed the transportation market, whereas the first thirty years of automobiles did not.

Disruptive innovations tend to be produced by outsiders. The business environment of market leaders does not allow them to pursue disruption when they first arise, because they are not profitable enough at first and because their development can take scarce resources away from sustaining innovations (which are needed to compete against current competition). A disruptive process can take longer to develop than by the conventional approach and the risk associated to it is higher than the other more incremental or evolutionary forms of innovations, but once it is deployed in the market, it achieves a much faster penetration and higher degree of impact on the established markets.

### **Review of Literature**

Harvard Business School professor Clayton M. Christensen coined the term disruptive technology. In his 1997 best-selling book, "The Innovator's Dilemma," Christensen separates new technology into two categories: sustaining and disruptive. Sustaining technology relies on incremental improvements to an already established technology. Disruptive technology lacks refinement, often has performance problems because it is new, appeals to a limited audience, and may not yet have a proven practical application. (Such was the case with Alexander Graham Bell's "electrical speech machine," which we now call the telephone.)

In 2009, Milan Zeleny described high technology as disruptive technology and raised the question of what is being disrupted. The answer, according to Zeleny, is the support network of high technology. For example, introducing electric cars disrupts the support network for gasoline cars (network of gas and service stations). Such disruption is fully expected and therefore effectively resisted by support net owners. In the long run, high (disruptive) technology bypasses, upgrades, or replaces the outdated support network.

First, disruption directs you to look in places you might otherwise ignore. Christensen's research shows that disruption often starts at a market's edges. Sometimes that is in relatively undemanding market tiers, such as how mini mill manufacturers started in the rebar market. Disruption also takes root with customers that historically were locked out of a market because they lacked specialized skills or sufficient financial resources to consume existing solutions. Sometimes the place to look is in physical locations where consumption was historically difficult if not impossible. Finally, fringe markets like hackers or students can put up with the limitations that often characterize early versions of disruptive ideas.

Technology, being a form of social relationship, always evolves. No technology remains fixed. Technology starts, develops, persists, mutates, stagnates, and declines, just like living organisms. The evolutionary life cycle occurs in the use and development of any technology. A new high-technology core emerges and challenges existing technology support nets (TSNs), which are thus forced to coevolve with it. New versions of the core are designed and fitted into an increasingly appropriate TSN, with smaller and smaller high-technology effects. High technology becomes regular technology, with more efficient versions fitting the same support net. Finally, even the efficiency gains

diminish, emphasis shifts to product tertiary attributes (appearance, style), and technology becomes TSN-preserving appropriate technology. This technological equilibrium state becomes established and fixated, resisting being interrupted by a technological mutation; then new high technology appears and the cycle is repeated.

Regarding this evolving process of technology, Christensen said:

"The technological changes that damage established companies are usually not radically new or difficult from a technological point of view. They do, however, have two important characteristics: First, they typically present a different package of performance attributes—ones that, at least at the outset, are not valued by existing customers. Second, the performance attributes that existing customers do value improve at such a rapid rate that the new technology can later invade those established markets."

Joseph Bower explained the process of how disruptive technology, through its requisite support net, dramatically transforms a certain industry.

"When the technology that has the potential for revolutionizing an industry emerges, established companies typically see it as unattractive: it's not something their mainstream customers want, and its projected profit margins aren't sufficient to cover big-company cost structure. As a result, the new technology tends to get ignored in favor of what's currently popular with the best customers. But then another company steps in to bring the innovation to a new market. Once the disruptive technology becomes established there, smaller-scale innovation rapidly raise the technology's performance on attributes that mainstream customers' value." The automobile was high technology with respect to the horse carriage; however, it evolved into technology and finally into appropriate technology with a stable, unchanging TSN. The main high-technology advance in the offing is some form of electric car—whether the energy source is the sun, hydrogen, water, air pressure, or traditional charging outlet. Electric cars preceded the gasoline automobile by many decades and are now returning to replace the traditional gasoline automobile.

Milan Zeleny described the above phenomenon. He also wrote that:

"Implementing high technology is often resisted. This resistance is well understood on the part of active participants in the requisite TSN. The electric car will be resisted by gas-station operators in the same way automated teller machines (ATMs) were resisted by bank tellers and automobiles by horsewhip makers. Technology does not qualitatively restructure the TSN and therefore will not be resisted and never has been resisted. Middle management resists business process reengineering because BPR represents a direct assault on the support net (coordinative hierarchy) they thrive on. Teamwork and multi-functionality is resisted by those whose TSN provides the comfort of narrow specialization and command-driven work."

### **High-technology effects**

High technology is a technology core that changes the very architecture (structure and organization) of the components of the technology support net. High technology therefore transforms the qualitative nature of the TSN's tasks and their relations, as well as their requisite physical, energy, and information flows. It also affects the skills required, the roles played, and the styles of management and coordination—the organizational culture itself.

This kind of technology core is different from regular technology core, which preserves the qualitative nature of flows and the structure of the support and only allows users to perform the same tasks in the same way, but faster, more reliably, in larger quantities, or more efficiently. It is also different from appropriate technology core, which preserves the TSN itself with the purpose of technology implementation and allows users to do the same thing in the same way at comparable levels of efficiency, instead of improving the efficiency of performance.

Based on the framework, today's modern information and knowledge-based technologies tend to be high technologies with high-technology effects. They integrate task, labor, and knowledge, transcend the classical separation of mental and manual work, enhance systems aspects, and promote self-reliance, self-service, innovation, and creativity. In comparison, the "low" technologies, no matter how new, complex, or advanced, are those that still require the dividing and splintering of task, labor, and knowledge, increase specialization, promote division and dependency, sustain intermediaries, and diminish initiative.

As for the difference between high technology and low technology, Milan Zeleny once said: "The effects of high technology always break the direct comparability by changing the system itself, therefore requiring new measures and new assessments of its productivity. High technology cannot be compared and evaluated with the existing technology purely on the basis of cost, net present value or return on investment. Only within an unchanging and relatively stable TSN would such direct financial comparability be meaningful. For example, you can directly compare a manual typewriter with an electric typewriter, but not a typewriter with a word processor. Therein lies the management challenge of high technology. "

However, not all modern technologies are high technologies. They have to be used as such, function as such, and be embedded in their requisite TSNs. They have to empower the individual because only through the individual can they empower knowledge. Not all information technologies have integrative effects. Some information systems are still designed to improve the traditional hierarchy of command and thus preserve and entrench the existing TSN. The administrative model of management, for instance, further aggravates the division of task and labor, further specializes knowledge, separates management from workers, and concentrates information and knowledge in centers.

As knowledge surpasses capital, labor, and raw materials as the dominant economic resource, technologies are also starting to reflect this shift. Technologies are rapidly shifting from centralized hierarchies to distributed networks. Nowadays knowledge does not reside in a super-mind, super-book, or super-database, but in a complex relational pattern of networks brought forth to coordinate human action.

## **2. Objectives**

- 1) To analyze the impact of Disruptive innovation to the business investors
- 2) To suggest suitable methods to face Disruptive innovation

### **3. Discussion**

Disruptive technology shakes the industry and creates entirely new era or phase. Following discussion clarify the same.

Typewriters, replaced by Desk tops, Desk tops replaced by Laptops, Laptops by Palmtops and Tabs and so on.

Computers innovation disrupted the Television.

Email invention replaced the letters, postal and greeting cards.

Cell phones disrupted telecom industry. Now rare users of land line phones. Laptops replaced desktops.

Smart phones with its huge applications it is disrupted MP3 Palayers, Cameras, GPC Devices, Video recorders, entertainment tools and often replace the laptops. Few prefer a tablet.

Cloud computing is disruptive technology in the business world, displacing many resources that would conventionally have been located in-house or provided as a traditionally hosted service.

Social networking like Facebook, WhatsApp, Twitter, LinkedIn has had a major impact on the way we communicate and -- especially for personal use -- disrupting telephone, email, instant messaging and event planning.

NEFT, NET transfer, ATM's reduced bank transactions.

### **4. Findings & Suggestions:**

- 1) Disruptive Technology is present at all times.
- 2) Disruptive technology doesn't have the intention of collapsing or replacing the present technology
- 3) Disruptive technology makes business men to think before investment
- 4) Disruptive innovation cannot be forecasted or estimated. Hence Companies can't take precautions at times.
- 5) The industry only survives which adopts changes.
- 6) The industry which spends more amount for R& D only can survive.
- 7) When we compare the world countries, the countries which spends for R&D and good education, they have more disruptive innovations.
- 8) Disruptive with the low quality will not survive for long run. Only gray market they will survive like China Market Products.
- 9) Quality always commands like the Bullet Trains project for Japan.
- 10) America Disruptive innovation in nuclear sector is the mile stone.
- 11) ISRO's inventions made India to the top in the Map.

### **5. Conclusion:**

In the modern era of Globalization, Liberalization and Privatization, disruptive innovations are quite common. Hence the big investors should choose the sector or area where there is a need of high investment and one can not easily enter into that business. Medium and small scale business companies will have this threat even after taking all the precautions.

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# Pearson and Partial Correlation –Based Network for National Stock Exchange India with World’s Major Exchanges

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## **Abstract:**

*This paper aims to find the correlation between various stock markets with respective national stock exchange(NSE) in India using Pearson’s correlation and partial correlation-based network. The correlation and network analysis outcomes can use as indicators by investors for investing their money in the stock market. In this study, we are considering world’s major indices from the United States (US), United Kingdom, Europe (Argentina, Belgium, France, and Germany), Russia, Japan, Hong Kong, China, Singapore, Australia, Indonesia, Malaysia, New Zealand, South Korea, Taiwan, Brazil, Mexico, Israel and India. From the abovementioned countries, 34indices were selected. Their historical data is available in public domain. The duration of the data is 1 Jan 2008 to 30 Jan 2022. We have designed the framework in python programming language to explore the Pearson correlation and Partial correlation-based network with validation of results and their reliability NSE and other indices. During these experiments, we found that Pearson correlation coefficient and Partial correlation coefficient are completely different, however; the NSEI is integrated with other markets and it is closely related to Singapore market.*

## **Keywords:**

Prediction, Reliability, Validity, Correlation, Stock Exchange, National Stock Exchange India

## **1. Introduction:**

In recent years many investors are in the search of finding the correlation among various stock markets for investing their money. Investors are always in search of the best tool, many of them using fundamental or technical analysis for prediction purposes. There is a cluster of investors who are very active and they invested money based on correlation as a parameter. Network correlation gives a better visualization of markets. Investors diversify risk by selecting different types of them. The purpose is to visualize which markets are closely associated and behave similarly to NSEI. Previous studies show the impact of correlation and their significant benefit on global economy. In January 2018, Punjab National Bank Scam comes into the picture and banking sector start deteriorating as a result investor’s lost millions of rupees in it. Furthermore, it generates turmoil in banking sector. Correlation can describe the situation among the sectoral group. There are many more examples around us. Due to globalization, the small markets followed the large markets, in one or more segments. The study covers prediction through correlation i.e. relationship between two or more indices based on that prediction can perform.

Correlation between a new measure and an established measure is important for validating the result. Reliability of correlation is very important i.e. test-retest reliability and inter-rater reliability.

Previous research has proposed various analytical methods for describing the correlation in the financial market, one of the most popular being correlation-based financial networks. The widely used method measures the correlation among the stock market. The nodes represent the stock market and the edges represent the correlation among the stock market. The literature provides a variety of correlation-based networks and constructs the network with the facility of filtering.

King and Wadhvani [1] constructed a model which tells us that the contagion can be transmitted to another financial market. Hamao, Masulis and Ng use the Autoregressive Conditional Heteroskedastic (ARCH) statistical model on examining daily opening and closing prices of the major stock markets in the US, Japan and UK. They found the contagion effect. Engle and Ito [2] show the correlation between New York and Tokyo Stock Exchanges and found each daytime return with an overnight return correlation. Campbell and Hamao [3] concluded that Japanese and US Markets are correlated and integrated. Lee and Kim [4] examined the effect of New York Stock Exchange market crash in 1987 and the shows the correlation among other national stock markets. Kasa [5] found the US and Great Britain integration depends on discount rate of stocks. Darbar and Deb [6] examined the correlation between Tokyo Stock Exchange with US Market. By using Johansen co-integration methodology, Chaudhuri [7] examined the common trend in Asian market (Indonesia, Malaysia, Philippines, Singapore and Thailand). The observation is quite surprising except in Indonesia all markets are correlated. Bae and Cheung [8] concluded the October 1987 crash make the spillover effects from the US to Hong Kong. Mantegna [9] studied the financial market correlation structures using Minimum Spanning Tree of correlation-based networks. Later Similar studies are made [10-12]. These correlation-based network provides an easy visual representation of multivariate time series and extracts meaningful data. The network analysis allows for observing the market trend, especially during crises [13]. Johnson and Soenen [14] investigated the degree of integration between the Japanese Market with Asian markets, further they found that Australia, Hong Kong, Malaysia, New Zealand, and Singapore are highly integrated with the stock market in Japan. Tumminello et al. [15] extend the MST by adding a planar maximally-filtered graph (PMFG), Boginski et al. [16] proposed the correlation threshold (CT). Pearson correlation-based network approaches are widely applied to various financial markets [17-28]. Partial correlation-based network approach filter the complex result. The correlation between the two financial markets affected other financial markets. The partial correlation-based network approach is also called a dependency network [29-30] the correlation-based network is included [31-34]. Coelho et al. [35] used the Pearson correlation-based MST to construct a dynamic network of 53 stock markets during the period 1997–2006 and find that the network tends to become increasingly compact. Gilmore et al. [36] employ the Pearson correlation-based MST method to study the contagion between European Financial markets. Eryigit and Eryigit [37] investigate the correlation structure of world stock markets using the Pearson correlation-based MST and PMFG and obtain a result that agrees with Gilmore et al. [36] that the French stock market is the most important node in both the MST and PMFG networks. Liu and Tse [38] study the correlation structure of world stock markets during the period 2006–2010 using the dynamic Pearson CT method and find that the behavior of stock markets in different countries is synchronous. There is very less work concerning NSEI.



In this paper, we are measuring the correlation between the financial markets with NSEI. Pearson’s correlation-based Network is used to represent the relations and along with MST is used to filter the interested market. The two approaches widely used in the literature survey for this study namely Pearson’s correlation and partial correlation-based network. The Pearson correlation coefficient-based Network was constructed through MST. We aim to compare the two techniques and validate the existence of a correlation between NSEI with other stock exchanges. The partial correlation coefficient can be measured in three ways: linear regression, Iterative Method and matrix inversion. Calculating the correlation through linear regression is a tedious job whereas Iterative method is very time expensive, the most effective way is to use matrix inversion method therefore in this experiment we use matrix inversion method.

**2. Methodology:**

**2.1 Data Collection:**

In this paper, the last fourteen years i.e. from 1 Jan 2008 to 30 Jan 2022 data is collected through yahoo finance. During these periods US Finance crisis 2008, the European debt crisis, the Indian demonetization 2016, Punjab National Bank Scam 2018 covered. The stock market is selected across the geographical regions, eight from Asia, three from Europe, three from America and one from Australia has chosen for a case study. The stock market indices are converted into US dollars. Table 1 List of stock exchanges present in this study.

Pearson correlation coefficient is used to calculate the relationship between two linear variables. To construct Pearson and Partial correlation-based MST for the stock markets we calculate the daily return of all the pairs. The Pearson correlation coefficient is defined as:

$$r = \frac{\sum_i(x_i-\bar{x})(y_i-\bar{y})}{\sqrt{\sum_i(x_i-\bar{x})^2}\sqrt{\sum_i(y_i-\bar{y})^2}} \dots\dots\dots\text{equation (i)}$$

$r$  = Correlation Coefficient

$x_i$  = Values of the x variable in the sample

$\bar{x}$  = Mean of the values of the x variable

$y_i$  = Values of the y variable in the sample

$\bar{y}$  = mean of the values of the y variable

The Pearson correlation is used to measure the correlation between two variables association. The  $r = 1$  indicate perfect positive correlation and  $r = -1$  means perfect negative correlation.

Sr. No.	Symbol	Name	Country	Continent
1.	GSPC	S&P 500	United States	America
2.	DJA	Dow Jones Industrial Average	United States	America
3.	IXIC	NASDAQ Composite	United States	America
4.	NYA	NYSE Composite (DJ)	United States	America

5.	XAX	NYSE Amex Composite Index	United States	America
6.	BUK100P	CBOE UK 100 Price Return	United Kingdom	Europe
7.	RUT	Russell 2000	United States	America
8.	VIX	VIX	United States	America
9.	FTSE	FTSE	United Kingdom	Europe
10.	GDAXI	DAX Performance Index	Germany	Europe
11.	FCHI	CAC	French	Europe
12.	STOXX50E	ESTX50PR.EUR	Europe	Europe
13.	N100	EURONEXT	Europe	Europe
14.	BFX	BEL	Belgium	Europe
15.	IMOEX.ME	MOEX Russia Index	Russia	Europe & Asia
16.	N225	Nikkei	Japan	Asia
17.	HIS	HANG SENG INDEX	Hong Kong	Asia
18.	00000.SS	SSE Composite Index	China	Asia
19.	399001.SZ	Shenzhen Component	China	Asia
20.	STI	STI Index	Singapore	Asia
21.	AXJO	S&P/ASX	Australia	Oceania
22.	AORD	All ORDINARIES	Australia	Oceania
23.	BSESN	S&P BSE SENSEX	India	Asia
24.	JKSE	JAKARTA Composite Index	Indonesia	Asia
25.	KLSE	FTSE Bursa Malaysia	Malaysia	Asia
26.	NZ50	S&P/NZX50	New Zealand	Oceania
27.	KS11	KOSPI	South Korea	Asia
28.	TW11	TSEC Weighted Index	Taiwan	Asia
29.	GSPTSE	S&P/TSX Composite Index	China	Asia
30.	BVSP	IBOVESPA	Brazilian	America
31.	MXX	IPC MEXICO	Mexico	North America
32.	MERV	MERVAL	Argentina	South America

33.	TA125.TA	TA-125	Israel	Asia
34.	NSEI	NSE	India	Asia

**Table 1:List of stock exchanges used in present study**

**2.2 Data Cleansing:** It is the process of cleaning and correcting data. Data Cleansing is performed using python script.

**2.3 Data Integration:** Cleaned data is merged into one data frame with date as the common attribute among two stock indices.

The Pearson’s correlation matrix is of N= 34 stock exchanges C is defined as:

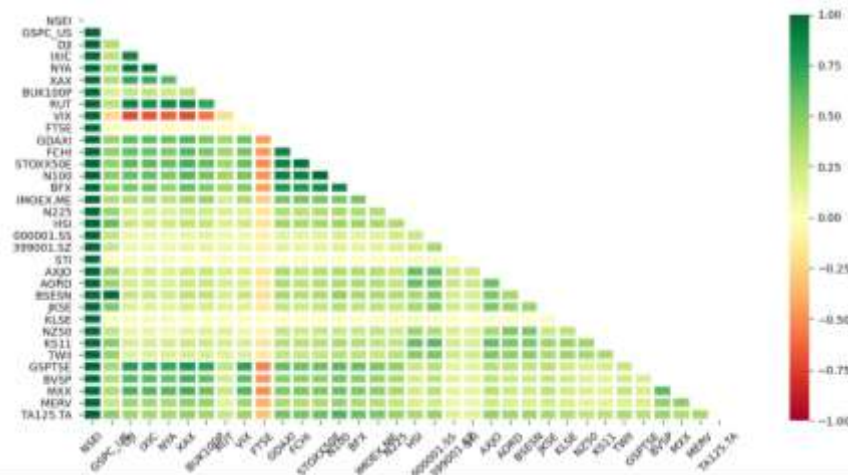
$$C = \begin{bmatrix} C_{11} & \dots & C_{1N} \\ \vdots & \ddots & \vdots \\ C_{N1} & \dots & C_{NN} \end{bmatrix} \dots\dots\dots\text{Equation(ii)}$$

Where,  $C_{ij}$  ranges from 1 to 33 and N indicated participation in stock exchanges. In our case N = 34. The matrix represents the correlation between corresponding stocks. p-value or calculated probability is used in hypothesis testing to help for selecting or rejecting the hypothesis. The p-value is the evidence against the null hypothesis. The smaller the p-value, the stronger the evidence that you should reject the null hypothesis. If the p-value is  $\leq 0.05$  then it rejects the null hypothesis. Whereas if the p-value is  $\geq 0.05$  means alternative hypothesis is weak. The degree of freedom of an estimate is the number of independent pieces of information that went into calculating the estimate. t- Statistics is used in hypothesis testing. The detail of Pearson’s correlation coefficient, T-statistics is shown in Table 2.

ID	Stock Exchange	Sample(N)	Pearson's(r)	t-Statistic	Degree of Freedom
1.	BSESN	3169	0.99253	457.83073	3167
2.	STI	3090	0.62422	44.40042	3088
3.	HIS	3029	0.59728	40.97246	3027
4.	JKSE	2999	0.50699	32.20028	2997
5.	KS11	3174	0.49521	32.10329	3172
6.	TA125.TA	2392	0.48322	26.98287	2390
7.	N100	3145	0.48111	30.76701	3143
8.	FCHI	3145	0.46403	29.36791	3143
9.	BFX	3144	0.46102	29.12115	3142
10.	GDAXI	3119	0.46017	28.93720	3117
11.	STOXX50E	3092	0.45962	28.76793	3090
12.	TWII	3000	0.45172	27.72315	2998
13.	AORD	3109	0.43693	27.07594	3107
14.	AXJO	3106	0.43309	26.76981	3104
15.	KLSE	3027	0.42796	26.04322	3025
16.	N225	2977	0.42261	25.43347	2975
17.	NYA	3093	0.38972	23.52740	3091

18.	GSPTSE	3082	0.38862	23.40740	3080
19.	MXX	3087	0.36954	22.08884	3085
20.	XAX	3093	0.36284	21.64801	3091
21.	BVSP	3044	0.36184	21.40762	3042
22.	IMOEX.ME	1574	0.35704	15.15496	1572
23.	DJI	3093	0.34568	20.48131	3091
24.	GSPC_US	3093	0.34556	20.47324	3091
25.	RUT	3093	0.31473	18.43480	3091
26.	IXIC	3093	0.30995	18.12481	3091
27.	000001.SS	2979	0.28797	16.40721	2977
28.	NZ50	3006	0.28504	16.29884	3004
29.	Stock 399001.SZ	2977	0.27054	15.32781	2975
30.	MERV	3000	0.26798	15.23002	2an 998
31.	BUK100P	2413	0.20093	10.07145	2411
32.	FTSE	3094	0.00087	0.04838	3092
33.	VIX	The partial	-0.22383	-12.76817	3091

**Table 2: Pearson’s Correlation, T- Statistics**



**Figure 1: Heatmap of NSE with Other stock Exchange**

The result of Pearson’s Correlation Coefficient is converted into an adjacency matrix or connection matrix. The matrix is converted into MST using Kruskal’s algorithm [39].

Partial correlation coefficient matrix is calculated using matrix inversion method used. The first step involves finding matrix inverse of C.

$$C' = C^{-1} = \begin{bmatrix} C'_{11} & \dots & C'_{1N} \\ \vdots & \ddots & \vdots \\ C'_{N1} & \dots & C'_{NN} \end{bmatrix} \dots \dots \dots \text{Equation (iii)}$$

For any two stock exchanges the partial coefficient is :

$$C_{ij}^* = - \frac{c'_{ij}}{\sqrt{c'_{ii} c'_{jj}}} \dots \dots \dots \text{Equation (iv)}$$

The  $C_{ij}^{i*}$  is the net correlation between two stock exchanges. Thus the partial correlation matrix is defined as:

$$C^* = \begin{bmatrix} C^*_{11} & \cdots & C^*_{1N} \\ \vdots & \ddots & \vdots \\ C^*_{N1} & \cdots & C^*_{NN} \end{bmatrix} \dots\dots\dots \text{Equation (v)}$$

The Partial Correlation coefficients tree shows in Figure 2. The nodes are the ID of stock exchange given in table 2. NSEI ID is one. The tree shows relationship among various markets.

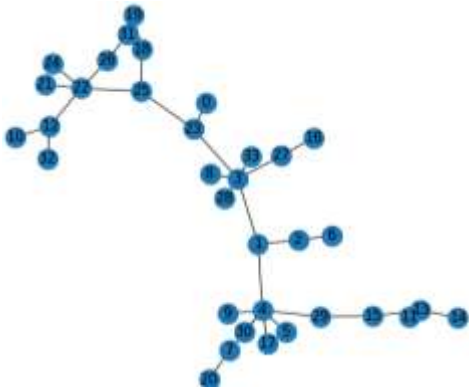


Figure 2: Partial Correlation Coefficients

Along with MST-Pearson’s Correlation Coefficient and MST- Partial Correlation Coefficient we constructed the Hierarchical tree (HT) using ultrametric distance metric that to using Euclidean distance for construction of HT Pearson’s Correlation (Figure 3) and Partial Correlation Coefficient respectively(Figure 4).

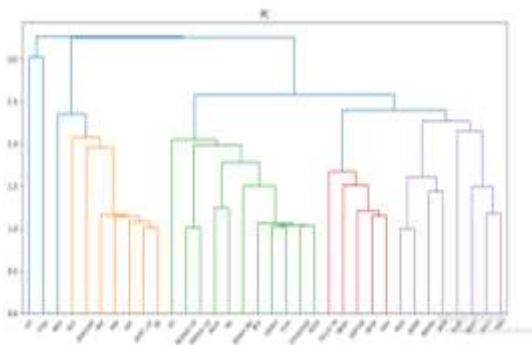


Figure: 3

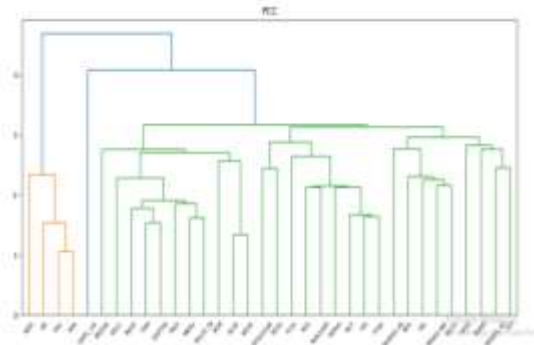


Figure: 4

**3. Result and Discussion:**

The model is developed using Python 3.9.1 with Numpy, Pandas etc. packages to carry out the different tests. The pair requires finding the correlation between two sets. To achieve the same daily return is calculated from the respective indices. The correlation of two indices is based on Pearson’s Correlation coefficient. Bombay Stock Exchange India is very closely associated with NSEI therefore its eliminated from the study. There are various studies the correlation that exists in a bigger market with a smaller market. Pearson’s correlation coefficient and Partial Correlation Coefficient are calculated and stored in matrix. Kruskal’s Algorithm is used to construct a Minimum Spanning tree from the matrix data. The node represents the stock exchange and edges represent the correlation among them. The Pearson’s Correlation Coefficient is very close to STI i.e 0.62422 and the p-value is very significant. On the other hand, the Partial Correlation Coefficient of STI is calculated as 0.070846 and the p-value is very significant. Figure 1 represents the Heatmap between different stock exchanges. Figure 2 shows the relation among various markets. The hierarchy tree in Figures 3 and 4 is almost the same. Based

on the experiment we concluded that the Pearson's correlation Coefficient and Partial Correlation Coefficient even though they have different values but the result is same. The closest market for NSEI is STI and it also has some relation with other Asian markets.

#### 4. Conclusion:

In this paper, we implemented the python program to study the correlation among other world's major stock markets with respective NSEI. The data is collected through yahoo finance which is available in the public domain. The frequency of data is based on a daily basis. The duration of collected data is 1 Jan 2008 to 31 Jan 2021. We examine Pearson's correlation coefficient and Partial correlation coefficient with statistics. Finally, we construct MST using Kruskal's Algorithm.

Studying Pearson's Correlation and Partial Correlation coefficient for the world's major stock markets we found that. i. The difference between Pearson's Correlation and Partial Correlation Coefficient has different results and their distribution is different. ii. Pearson's Correlation MST is different from Partial Correlation MST. iii. The Cluster of geographical distribution is observed. iv. The p-value gives good significance for the SIT. 4. HT Partial is more hierarchical compared to HT Pearson. We have only considered the world's major indices with NSEI.

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## An Exploration into People's Perception of Crypto currencies and select Block chain-based Digital Assets in India

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### **Abstract**

*Crypto currencies and Bitcon are popularly known as virtual currency gained a rapid attention among investors. With the block chain technology, the transactions related to digital assets are said to be secured. Reports show that over 105 million Indian investors hold Crypto currencies. Government of India has been taking steps in regulating crypto currencies by levying taxes. As crypto currencies and block chain technology intend towards a better and foolproof way of the financial system operations, an attempt been made to know the peoples' perception towards Crypto currencies in India. The present study focuses on understanding the perception of Indians and to know the acceptability and viability of crypto currencies in the country. Primary data has been collected using simple random sampling. The results of the study shows that awareness and application among Indians is less and most of them are averse towards crypto currencies due to its complexity.*

**Keywords:** Crypto currencies, Block chain Technology, Investors, Government of India, Digital assets

### **Introduction**

A crypto currency is referred as an encrypted data string that denotes a unit of currency. It is monitored and organized by a peer-to-peer decentralized network called a Block chain. Block chain is essentially like a set of connected blocks or an online ledger. A block contains a set of transactions that have been independently verified by each member of the network. Every new block generated would be verified by each node before it is said to be confirmed, making it almost impossible to forge transaction histories. Units of Crypto currency are created by a process called mining, which involves using computers to solve complicated mathematical problems that generate coins.

Block chain technology now enables the creation of non-fungible digital assets or non-fungible tokens (NFTs) and having them exist on the decentralized network. A digital asset is said to be anything that is stored digitally and is uniquely identifiable that organizations can use to realize value. Examples of digital assets include images, videos, logos, documents, audio, slide presentations, spreadsheets and websites. Such digital assets can be exchanged online for a few specific types of programmable Crypto currencies like Ethereum, Solana, Polygon, etc.

Bitcoin is the world's first broadly accepted form of Crypto currency. Bitcoin is so popular that there was a time when its name was synonymous with Crypto currency. In 2021, one Bitcoin costed \$68,000. But one doesn't always have to buy an entire coin, smaller fractions of a coin can be bought. Since the birth of Bitcoin, the Crypto currency market is much more diverse and in just over a decade there are now more than 6000 forms of Crypto currencies, also known as alt-coins.

People that may not completely understand the concept of Block chain technology are interested in the profit-making opportunities in the Crypto currency trading markets. Users today can buy Crypto currencies from central exchanges, brokers, and individual currency owners or even sell it to them. Exchanges or platforms like Coin base are the easiest methods to buy or sell Crypto currencies.

As more and more young Indian investors are eager to explore newer investment options, they are adopting Crypto currencies such as Bitcoin, Ethereum, and Polygon to make investments that promise them viable returns. As per the various reports, Over 115 million investors in India either hold crypto currency or have traded in the past six months, among them 15 per cent of the Indian population aged between 18 to 60 years. (survey by **KuCoin**)

In India, bitcoin has been available since 2012. In 2018, in India, there were 11 trading platforms and around 1 million users of bitcoin. RBI had banned the transaction of bitcoins in India. So, one could not use Crypto currency for the payments of goods and services. During the union budget declaration in 2018, the Indian government declared that Crypto currencies such as bitcoins were not legal tender. There was no protection available to those using and trading them or dealing in them.

As per Union Budget 2022, it is proposed to classify cryptos as virtual digital assets (VDA) and identified as assets. As per the new crypto tax rule, a person has to pay a flat 30 per cent tax on income earned from the transfer of Crypto currencies and other virtual digital assets, including NFTs.

Now that the Indian government has made the first step toward regulating Crypto currencies by levying taxes on its ownership and transfers, more and more Indians are interested in getting themselves involved with Crypto currencies and NFTs without much hesitation. In fact, about 105 million Indians hold Crypto currencies and over 1 million Indians trade in Crypto currencies. All of this is mainly the result of a huge boom in the

Crypto currency market after the rise in Bitcoin's price and the hype surrounding various altcoins.

According to a study on "Crypto Industry in India" by the National Association of Software and Services Companies (Nasscom) and industry partner WazirX, the Crypto currency market in India has been growing exponentially over the past few years and is expected to grow up to \$241 million by 2030 in India and \$2.3 billion by 2026 globally. Yet, it is safe to say that a majority of people are still highly sceptical about Crypto currencies' possible future.

This study aims to understand Indian people's mindset towards Crypto currencies, segregate people's perception based on the demographics and attempt to predict the future of Crypto currencies in India based on people's perception.

## **Review of Literature**

### **India's Crypto currency adoption level**

As per a comprehensive survey conducted in 2021 by Kantar, the world's leading data, insights and consulting company, 83 per cent of urban Indians are aware of Crypto currencies and 16 per cent of them have Crypto currency ownership. The research was conducted with a sample of 2000 Indians across 25 cities. India has been ranked second in the Chainalysis Adoption Index. Chainalysis is a Block chain data platform and the Chainalysis Adoption Index provides an objective measure of what countries have the highest Crypto currency adoption levels. 20 per cent of the 16 per cent crypto owners come from 4 metropolitan cities namely, Delhi, Mumbai, Bengaluru and Hyderabad. Bitcoin has the highest ownership with 75 per cent followed by Dogecoin at 47 per cent and Ethereum at 40 per cent. About 19 per cent of Indians intend to invest in Crypto currencies in the near future.

### **Global Acceptance of Crypto currency**

Ryan Farrell's (2015), the scope of the success of Crypto currency ultimately depends on gaining public acceptance despite the retailers' official response to Crypto currency. The intrinsic value and the system of Crypto currency as an alternative method of payment are unsustainable without public trust. This process will require extensive education and assurance to appease the sceptical public. Despite news stories and media coverage making Crypto currencies gain a presence in the global market, Crypto currencies are still widely unknown to the general public. Many companies including banks reject the embedding of Crypto currencies into their systems. It is ironic that Bitcoin, which was founded as a better alternative to the regulatory nature of centralized currency schemes is the main reason for concern for the financiers.

### **Challenges in the Crypto currency industry**

Shailak Jani's (2018), the confidence and trust rate in using Crypto currencies is high but the users do not yet realize the full picture of using Crypto currencies. A lot of Crypto currencies and Crypto currency platforms do not deserve the amount of trust they get from the public.

Users need to take extra precautions for using Crypto currency until it is well regulated and controlled because many concerns, challenges and issues still exist in the Crypto currency industry. The future of the Crypto currency concept is promising, revealing more

opportunities to bring positive changes and progress to the e-Business and e-Payment sectors. With the rapid progress and improvement in technology, Crypto currency will not stop progressing. Trust and confidence are important factors that need to be investigated further in terms of using and trading Crypto currency forms. The research scope can be further extended to developing use-cases for applications of Crypto currency across different sectors in India.

### **Elon Musk's influence on the Crypto currency industry**

According to Edward Oosterbaan's article on CoinDesk: Elon Musk, the richest man in the world, founder of SpaceX and CEO of Tesla has had a major impact on the Crypto currency market in the past few years. He took to social media, mainly Twitter, to promote a memecoin: Dogecoin and Bitcoin. It is fair to say that he is one of the main reasons for the increase in the price of Dogecoin. Elon sent multiple tweets about Dogecoin which caused it to increase over 50% within a single day. He also announced that Tesla would be accepting Bitcoin as payment which made bitcoin reach \$65,000 in just a month since the tweet. Announcing that Tesla would trial run accepting Dogecoin for merchandise made it increase 43% in just a few hours. Of course, this hype generated by Elon didn't last long but it did attract many investors and made them realize the potential of Crypto currencies and Block chain technology.

#### **Hypothesis:**

H1 – There is a significant difference between respondents who trade in the stock market and respondents who trade in Crypto currency.

H2 – There is a significant difference between age and inclination to buy Crypto currencies.

H3 – There is a significant difference between the gender and people's inclination to buy Crypto currencies.

### **Research Methodology**

The present study has been considered to know and identify whether people who invest in stock markets also invest in crypto currency. Whether Monthly income of the investors influence investments in crypto currency. The study also aims to identify demographic factors such as age and gender influence in investments in crypto currency.

The data collected for this study includes both primary and secondary data. The primary data is collected from surveys and questionnaires with a sample size of around 117 Indians, both active and inactive in the Crypto currency market. The secondary data is collected from various websites, journals and other news articles.

The survey form was distributed online to of people in India. Among those people, many were active participants of Crypto currency and stock market communities. The aim was to get a good mix of data in order to get all demographics' perceptions. Hence, efforts were made to reach a wider range of demographics. For example, the survey form was distributed to several female-specific online crypto currency communities, participants of the stock market communities.

### **Research analysis and findings :**

Hypothesis	P-value	Result
H1 – There is a significant difference between respondents who trade in the stock market and respondents who trade in Crypto currency	0.00164841	Accepted
H2 – There is a significant difference between age and inclination to buy Crypto currencies.	0.01913494194	Accepted
H3 – There is a significant difference between monthly income and inclination to buy Crypto currencies.	0.08429802124	Rejected
H4-There is a significant difference between Gender and people’s inclination to buy Crypto currencies	0.7925397311	Rejected

The study observed that there is a significant difference between the investors who trade in stock market and crypto currency. It is observed that there is no significant difference between related to geographical factors considered and there inclination towards purchase or investment in crypto currencies. It is found out that there is no significance difference in terms o Investors’ age, gender and income and there inclination and interest in purchase of crypto currencies. The study identified that awareness and knowledge regarding crypto currencies is significantly less.

### Conclusion:

Most of the results of the study were expected but a few were surprising. Most of the public is still very less aware about crypto currencies and its applications. It seems that the majority of the public has a negative impression surrounding all aspects of crypto currency due to lack of knowledge about it. They show an aversion towards crypto currencies because of its complexity and also negative news surrounding it. This might be too soon to judge crypto currency’s potential at present. Crypto currency and blockchain technology.

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# Risk-Return Analysis of Select Indian Companies

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## Abstract

*In today's world, investing money plays a vital role among everyone including the government. Without investment, it is difficult to survive the fluctuations caused due to inflation on various products and services. One can invest his or her money in banks, real estate, shares of the companies (stock market), insurance, bonds, mutual funds and many more products available in the capital / stock market. But among these, Stock market investment is said to be emerging and the best investment that can cope-up with the current economy. Identifying the potential stocks and taking correct investment decisions is very crucial. This study mainly aims at identifying the stocks from four sectors that have high growth potential in the future with the help of different ratios such as Sharpe Ratio, Treynor Ratio, Standard Deviation and Beta that are calculated based on the daily closing prices of the Indian companies and sectoral indices for the past five financial years that is from 1<sup>st</sup> April 2017- 31<sup>st</sup> March 2018 to 1<sup>st</sup> April 2021- 31<sup>st</sup> March 2022. The finding of the study can help an investor to choose the best stocks for a diversified portfolio from each of the four sectors having the highest growth potential in future with systematic risk and the stock which gives a good amount of return on investment (ROI) in the times ahead.*

## Keywords

Investment analysis, Performance analysis, Risk-Return analysis, Sharpe ratio, Treynor ratio.

## Introduction

Investment is the lifeblood of a middle-income class-earning individual. Traditionally, Investment was considered to be an act of investing the excess money remaining after his or her expenditures. In the modern-day school of thought, individuals have started reversing the ideology by giving importance to the habit of saving one's income and planning in such a manner that the investment is made before envisaging expenditures. It is very important to invest the money in precise forms of investment. The various forms of investments are bank deposits, mutual funds, exchange traded funds (ETFs), insurance products, stock market, bonds, pension schemes, etc. A survey revealed the awareness of investors among investment avenues among salaried people of Pune, India (Ansari, 2020). Compared to all other investments, the stock market is becoming more and more glamorous to investors for the past few decades. Stock market is the place, where investors invest their savings with the expectation of earning some income (Reddy & Narayan, 2016). The Indian stock market has shown tremendous growth in the last 15 years compared to other markets of the world. The National Stock Exchange of India (NSE), has revealed that having a population of 138 crores only 1.2 crore have been found to be

actively following and investing in shares through stock market during the year 2021. This number is presumed to grow steadily year over year.

In India, there are two major stock exchanges namely, Bombay Stock Exchange (BSE) and National Stock Exchange (NSE). The Bombay Stock Exchange was the first stock exchange in Asia and the first to be recognized under the Securities Contract Regulation Act, 1956. Secondly, National Stock Exchange. The National Stock Exchange (NSE) is the leading stock exchange in India. It began operations in 1994 and is ranked as the largest stock exchange in India in respect of total and average daily turnover for equity shares every year since 1995. This study focuses on the companies that are listed on the National Stock Exchange (NSE).

The success of the investment in the stock market is assumed to be gained only when an investor invests in precise shares of the companies. The profitable portfolio depends on diversification, quantity and quality of the investment made. This can be achieved from doing proper analysis of stocks. The research carried out by Poornima & Saranya, n.d. shows the analysis on Risk- Return of stocks and relived some of the high-risk stocks to investors. The return of stocks also depends on the volatility and sentiments of the stock market. Rajendra N. Paramanika and Vatsal Singhal analysed the sentiment analysis of Indian stock market volatility and found that the negative sentiments are more in the market (Paramanik & Singhal, 2020).

#### Statement of the Problem

Downward market volatility offers investors who believe markets will perform well, in the long run, to shop for additional stocks in organizations that they prefer at lower costs. The aim of the study is to analyse the Risk-Return of shares and choosing the best companies from 4 different sectors in which each sector contains 10 companies with a total of 40 companies listed on National Stock Exchange of India (NSE). The analysis is based on the fundamentals of the companies, that is by comparing various ratios calculated from the daily closing price of the companies and sectoral indices for the past 5 financial years that is from 1st April 2017 to 31<sup>st</sup> March 2022. This study gains more importance as stocks taken for this study represents the majority of the capitalization of NSE. The analytical tools used for the analysis are Beta, Standard deviation, Portfolio Return, Risk free rate, Treynor's ratio and Sharpe ratio. When the beta is high stock price is also high and vice versa.

#### Literature Review

An investigative study (Saranya, 2016) to identify the relationship between growth rate and unsystematic risk and return of 12 selected stocks on NSE using Capital Asset Pricing Model (CAPM) aimed at providing a clearcut vision of the selected pharma stocks which helps the long term investor to make investment decisions in terms of risk and return with the help of CAPM revealed that the performance was not consistent among the select stocks as they did not provide more than 10% quarterly returns. All the stock traded were found to have traded with heavier risk factor.

Gautami and Nalla Bala Kalyan conducted a comparative analysis of risk and return of 4 selected companies namely Asian Paints, Bharti Airtel, Dabur India and Panyam Cements. The basic data like opening price and closing price are collected from India Bulls and

Internet from 2010-2015. The analytical tools used for the study are Average Returns, Beta, Standard Deviations, Covariance and Coefficient of Correlation. The article emphasized on the market fluctuations in relation to the prices of Script's which have been taken using fundamental analysis and technical analysis. The interpretation between covariance of selected companies and suggested that Asian Paints, Bharti Airtel and Panyam cements can be option to invest by the investor (GAUTAMI, 2018).

Ashok Bantwa and Faizan Ulhaqq Ansari attempted to diagnose the risk return profile of equity stocks of 10 selected Indian IT companies listed on IT Index of NSE. The risk return analysis is done with various analytical tools including absolute return, abnormal return, required rate of return as per CAPM model, volatility of return, systematic risk and risk adjusted return. The secondary data are collected from the annual report of companies and from NSE website for the period of five years from 2014-15 to 2018-19. This study finds that the Beta value of stock of all selected companies differ significantly. Whereas, Standard deviation, Expected Return by CAPM, Absolute Return of Stock and Alpha value of stock all selected companies don't differ significantly (Bantwa & Ansari, 2019).

A risk return evaluation and comparison of select stocks of BSE sensx revealed that there is volatility present in the stock market at times. The analysis was carried out with the help of tools like stock return, market return, Beta, standard deviation, correlation and variance for a 3-year period from 2008 to 2011. It was evident that banking and power sectoral stocks were at high risk as they moved in correlation with the performance of the economy, pharmaceutical, housing and FMCG had lower quantum of risk. Investors aiming to achieve their short-term return on investment goal shall refer to Beta as a measure (Santhosh & Rajani, 2019).

An attempt to evaluate the performance of banking stocks in National Stock Exchanges. This paper aims to give a clear view to the investors who are investing in banking stocks for better returns with less risk. Axis bank, IDFC bank, ICICI bank, Bank of Baroda, IndusInd bank, Union bank, Federal bank, Kotak Mahindra bank, SBI bank, HDFC bank, Punjab national bank, and YES bank are the banking stocks taken for analysis. The study covers 10 years with Two periods, Period 1 the UPA government from 2010 to 2014 and Period 2 the NDA government from 2015 to 2019. Researchers have used statistical techniques like Return, Average return, Standard deviation, Variance and Beta for better understanding and conclusion. This study found that Indus bank was the best performer and Punjab National bank was the least performer as a whole (Rao & Pillai, 2020).

An exploration to examine the short-term impact of Covid 19 on the major index NIFTY50 of the Indian stock market and its component sectors by taking into consideration 3 different models namely constant return model, market model, and market-adjusted model. It was identified that pandemic impacted bearishly on all the sectors temporarily and severe damage was on the finance sector. Policy strengthening measures can support the financial backbone to main stability and the pessimistic approach of investing in stock market can be overruled by the effectiveness in the mechanism that can be laid by the regulators. This study found that during pandemic sectors like pharmaceuticals, FMCG and IT had limited impacts and the financial sector had the worst impacts of all (Dhillon & Tyagi, 2020).



A study (Debnath & Srivastava, 2021) that aimed at designing an optimum portfolio giving optimum returns during the covid 19 period collected all the data from National Stock Exchange (NSE) ranging from 1st January 2020 to 31st December 2020 for a comparative analysis between pre-covid period and covid period (1<sup>st</sup> January 2021 to 18<sup>th</sup> October 2021) was carried choosing four companies from five different sectors such as pharmaceuticals, banks, petroleum, information technology and metal industries. It is assumed that no stocks were bought and sold during this entire period. It is found that the selected portfolio has performed significantly better in 2021. Then, the comparison is also made with some popular Mutual funds which also gave identical result.

An evaluation of the risk and return of selected banking stocks of the private and public sector for 10 years period of the two different regimes in the formation of central government (i.e.,) United Progressive Alliance and National Democratic Alliance was made alongside 12 banking entities inclusive of both public and private sector banks. Indus Ind bank proved to have provided higher returns with higher quantum of risk and were accepted by the investors.

The research undertaken to examine the risk-return components using Markowitz model and to gain proficiency in portfolio construction chose select companies thereby contributing to a strong portfolio. The data was collected for the period 2015-16 to 2019-20 and has taken 2 companies for each sector of 5. The best portfolio consists of Wipro, Hero Motor Corporation, Tata Motors, Ranbaxy, Cipla, ONGC, BPCL, SBI and ICICI Bank.(Nalla et al., 2021)

An attempt was made to analyse and highlight the risk and return of the companies of the financial sector taking the monthly closing price of 5 financial investment companies for the period ranging from January 2020 to July 2021. The sample companies are Aditya Birla Capital Ltd, Nippon Life India Asset Management Ltd, Cholamandalam Financial Holdings Ltd, India Infoline Finance Ltd (IIFL Finance), and JSW Holdings Ltd., belonged to S&P BSE finance index. Statistical tools like mean, standard deviation, skewness, kurtosis, beta, and correlation coefficient were used. Additionally, a paired t-test was used to examine the relationship between the monthly return of the S&P BSE Finance Index and the selected companies. From this process, it was found that India Infoline Finance Ltd (IIFL Finance) has shown the highest monthly returns with a high beta value which means high risk.(Lobo & S., 2021)

The indices BSE 30, BSE 100, BSE 200 and BSE 500 were analysed to understand the comparative risk and returns for two calendar years of 2020 and 2021 using correlation testing and paired t-test. The research predicted that the returns generated by BSE 30 and the sample indices of BSE has a significant difference and hinted the investors that money invested in BSE 30 has considerable amount of risk involved than that of the returns generated from the investment made in all other indices (Patjoshi, 2022).

Objectives of the study:

The study is based on the following objectives:

- a. To analyse the risk and return of selected companies.
- b. To analyse the past performance of the stocks.

- c. To determine the future performance of the stocks.
- d. To suggest investors the best stocks to invest in the future.
- e. To make aware of the analysis using Beta and Ratios.

### Methodology

The data used for the research are secondary data. The daily closing price and sectoral indices of the selected stocks are collected from the data published in the website of National Stock Exchange (NSE) of India. The Risk-free rate taken for the study is collected from the data published in the website of Reserve of India (RBI). The period of this study is 5 years, ranging from 1st April 2017 to 31st March 2022. Totally 4 sectors, each containing 10 companies, are considered for the analysis. For examining the above objectives analytical like Beta, Standard deviation, Portfolio Return, Risk free rate, Treynor's ratio and Sharpe ratio are used. MS Excel is used for carrying out the analytical work.

### Sampling:

A deep look in to the performance for select companies on sectoral basis are listed here:

<b>Pharma</b>	<b>Finance</b>	<b>I T</b>	<b>Banking</b>
Dr Reddy's Lab	Bajaj Finance	Coforge Ltd.,	HDFC Bank
Cipla Ltd.,	Muthoot Finance	HCL Tech Ltd.,	SBI Bank
Divi's Lab	Bajaj Finserv	Mindtree Ltd.,	ICICI Bank
Sun Pharma	Power Finance	TATA Elxsi Ltd.,	Axis Bank
Auro Pharma	Sundaram Finance	TCS Ltd.,	IndusInd Bank
Lupin Ltd.,	Manapuram Finance	Tech Mahindra	Yes Bank
Gufic Biosciences	Bajaj Holdings	Wipro	PNB Bank
Lincoln Pharma	Aditya Birla Finance	L & T Technology Services Ltd.,	Kotak Mahindra Bank
Glenmark Pharma	L & T Finance	Infosys	Bank of Baroda
Abbot India Ltd.,	M & M Finance	Reliance Industries	Bank of India

### Tools for analysis

#### Standard Deviation

Standard deviation of a stock tells us the amount by which the returns of the stock can go up or down with correlation with its mean. Standard deviation helps to determine the stock's volatility from its average price (Bahadur G. C. & Kothari, 2016). High standard deviation indicates the high volatility of the stock and low standard deviation means less volatility which makes the investment low risky. The standard deviation for the returns of the stock is calculated by using STDEV.P formula in MS excel by taking the square root for the average number of trading days in a year.

#### 1.1. Beta

Beta is the measure of expected movement of the stock proportion to the movement of the benchmark it follows. Beta measures the volatility of the stock relative to its benchmark. It can be used for comparing the relative systematic risk of different stocks and it is also employed by investors to determine the risk of a stock (Dash, 2015). Beta value of a particular stock greater than 1 indicates that the particular stock is more volatile than its benchmark and vice versa.

Formula in MS Excel: = slope(known\_ys,known\_xs).

Wherein,

Known\_ys are the daily returns of the benchmark

Known\_xs are the daily returns of the stock

### 7.3. Return on Portfolio

A ratio which indicates the net gain or loss on the portfolio investments over a particular period of time(Xiao, 2022). The below mentioned methodology is adopted to determine the portfolio return for the selected stock across sectors:

### 7.4. Risk Free Rate

Risk free rate is the rate of interest get on the investments with zero risk factor. It is the ideal investment income (Ke, 2018). The rate of interest for the 365 days Treasury Bill issued by RBI is taken for this study.

### 7.5. Average number of trading days

Average number of trading days in a year is calculated by dividing the total number of trading days in year by total number of years taken for the study.

### 7.6. Sharpe Ratio

Sharpe ratio evaluates risk and returns together to help to choose an investment that generates higher returns with optimal amount of risk taken. It is the ratio that measures the risk premium of the portfolio relative to its total amount of risk.

Formula: Shape ratio =  $(R_p - R_f) / \sigma_p$

$R_p$  = Average returns of a stock

$R_f$  = Average Risk-free return

$\sigma_p$  = Standard Deviation of a stock

### 7.7. Treynor Ratio

Treynor ratio was developed by Jack L. Treynor, which is also known as the reward-to-volatility ratio. It is the performance metric used to measure the excess return of a stock generated for each unit of risk taken for the particular stock. High Treynor ratio indicates the investor that the stock is acquiring a good return on investment.

Formula: Treynor's ratio =  $(R_p - R_f) / \beta_p$

$R_p$  = Average returns on a portfolio

$R_f$  = Average Risk-free return

$\beta_p$  = Beta value of a stock

## Results and Discussions

Table. 1 – Pharma Sector

Particulars	Avg. Trading Days	SD	Beta	$R_p$	$R_f$	Sharpe Ratio	Treynor Ratio
Dr Reddy's Lab	247.6	28.83%	0.91	9.37%	4.65%	0.16	0.05
Cipla Ltd.,	247.6	28.24%	0.89	11.43%	4.65%	0.24	0.08
Divi's Lab	247.6	32.35%	0.92	47.65%	4.65%	1.33	0.47
Sun Pharma	247.6	32.55%	1.19	5.73%	4.65%	0.03	0.01
Auro Pharma	247.6	40.59%	1.26	-0.43%	4.65%	-0.13	-0.04
Lupin Ltd.,	247.6	31.62%	1.00	-12.23%	4.65%	-0.53	-0.17
Gufic Biosciences	247.6	51.84%	0.75	29.95%	4.65%	0.49	0.34
Lincoln Pharma	247.6	45.87%	0.73	5.38%	4.65%	0.02	0.01
Glenmark Pharma	247.6	39.25%	1.03	-12.42%	4.65%	-0.43	-0.17
Abbot India Ltd.,	247.6	27.54%	0.37	30%	4.65%	0.92	0.68

Abbot India Ltd is having a lower standard deviation which denotes that the stock is less volatile compare to its average price on the other side Gufin bio science has a higher standard deviation and it is more volatile. The Beta of Lincoln pharma denotes that it is less volatile wherein Auro pharma shows more volatility compared to its benchmark. Over the last five financial years Divi's Lab has given the highest portfolio return and Glenmark pharma has given the lowest return on the investment. Sharpe Ratio predicted that Abbot India Ltd has generated higher return of 0.92% of every 1% of risk taken by the investor. Whereas, Auro pharma, Lupin and Glenmark Pharma has given loss to the investors. Treynor Ratio says that Abbot India Ltd has generated 0.68% of return for every 1% risk taken whereas, Auro pharma, Lupin and Glenmark Pharma has given lesser returns for the investors.

Table 2 – Finance Sector

Particulars	Avg. Trading Days	SD	Beta	$R_p$	$R_f$	Sharpe Ratio	Treynor Ratio
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Bajaj Finance	247.6	40.36%	1.20	45.41%	4.65%	1.01	0.34
Muthoot Finance	247.6	39.39%	0.84	29.47%	4.65%	0.63	0.30
Bajaj Finserv	247.6	36.91%	0.26	34.17%	4.65%	0.80	1.15
Power Finance	247.6	40.03%	-0.04	2.78%	4.65%	-0.05	0.49
Sundaram Finance	247.6	30.91%	0.20	5.36%	4.65%	0.02	0.04
Manapuram Finance	247.6	44.27%	1.01	2.89%	4.65%	-0.04	-0.02
Bajaj Holdings	247.6	31.71%	0.30	18.05%	4.65%	0.42	0.45
Aditya Birla Finance	247.6	59.47%	0.75	12.94%	4.65%	0.14	0.11
L & T Finance	247.6	44.67%	0.27	-7.47%	4.65%	-0.27	-0.45
M & M Finance	247.6	46.26%	0.38	-3.63%	4.65%	-0.18	-0.22

Aditya birla finance can be considered more volatile compared to other stocks. Power finance is less volatile and Bajaj finance is more volatile compared to its benchmark. Over the last five financial years Bajaj finance has given the highest portfolio return. L & T Finance Ltd and M & M Financial has given lower returns on investment. Sharpe Ratio indicates that when compared to other stocks, Bajaj Holding has shown higher return of 0.42% of every 1% of risk taken by the investor. Treynor Ratio says Bajaj Finserv has given the highest return of 1.15% of return for every 1% systematic risk taken by the investor whereas, L & T Finance Ltd, M & M Financial and Manappuram Finance have given lesser returns for the investors.

Table 3 – Information Technology Sector

Particulars	Avg. Trading Days	SD	Beta	R <sub>p</sub>	R <sub>f</sub>	Sharpe Ratio	Treynor Ratio
Coforge Ltd.,	247.6	44.72%	1.18	59.27%	4.65%	1.22	0.46
HCL Tech Ltd.,	247.6	35.99%	0.98	6.08%	4.65%	0.04	0.01
L & T Technology Services Ltd.,	247.6	39.19%	0.73	45.41%	4.65%	1.04	0.56
Mindtree Ltd.,	247.6	37.22%	1.05	56.55%	4.65%	1.39	0.50
TATA Elxsi Ltd.	247.6	45.27%	0.71	42.78%	4.65%	0.84	0.54
TCS Ltd.,	247.6	38.24%	0.88	29.67%	4.65%	0.65	0.28
Tech Mahindra	247.6	103.21%	1.25	52.52%	4.65%	0.46	0.38
Wipro	247.6	70.45%	1.07	24.21%	4.65%	0.28	0.18
Infosys	247.6	46.39%	0.98	-10.11%	4.65%	-0.31	-0.15

Reliance Industries	247.6	41.39%	0.56	6.76%	4.65%	0.05	0.04
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Tech Mahindra is having a higher standard deviation of 103.21% which denotes that the stock is high volatile compare to its average price on the other side HCL tech has a lower standard deviation of 35.99% and it is less volatile. When stocks are compared to its benchmark, Reliance Industries is found to be less volatile and Coforge is more volatile. For the past five financial years, Coforge has given the highest portfolio return of 59.27% and Infosys has given the lowest return on the investment of -10.11%. Sharpe Ratio denotes that Mind tree followed by coforge has generated high return for every 1% risk taken and Infosys has given lesser returns for the investors. Treynor Ratio says that L&T and Tata Elxsi has generated high return for every 1% risk taken whereas Infosys has given lesser returns for the investors.

*Table 4 –Banking Sector*

Particulars	Avg. Trading Days	SD	Beta	R <sub>p</sub>	R <sub>f</sub>	Sharpe Ratio	Treynor Ratio
HDFC Bank	247.6	33.68%	0.84	0.51%	4.65%	-0.12	-0.05
SBI Bank	247.6	37.46%	1.09	10.98%	4.65%	0.17	0.06
ICICI Bank	247.6	35.81%	1.18	20.56%	4.65%	0.44	0.13
Axis Bank	247.6	37.97%	1.19	8.74%	4.65%	0.11	0.03
Kotak Mahindra Bank	247.6	29.56%	0.82	14.90%	4.65%	0.35	0.12
IndusInd Bank	247.6	49.37%	1.29	-7.79%	4.65%	-0.25	-0.10
Yes Bank	247.6	86.11%	0.49	-61.93%	4.65%	-0.77	-1.37
PNB Bank	247.6	47.87%	0.90	-25.23%	4.65%	-0.62	-0.33
Bank of Baroda	247.6	45.99%	1.02	-8.33%	4.65%	-0.28	-0.13
Bank of India	247.6	48.53%	0.89	19.94%	4.65%	-0.51	-0.28

Kotak Mahindra bank is showing a lower standard deviation which denotes that the stock is less volatile compare to its average price on the other side Yes bank has a higher standard deviation and it is more volatile. Axis bank and ICICI bank is more volatile wherein Yes bank shows less volatility compared to its benchmark. Over the last five financial years Yes bank, Punjab National Bank, Bank of Baroda and Bank of India has given the loss the investors and ICICI bank has given the high return on the investment. Sharpe Ratio has predicted that ICICI bank has generated higher return of 06.44% of every 1% of risk taken by the investor. Whereas, YES bank, Punjab National bank, IndusInd bank, Bank of Baroda and Bank of India has given loss to the investors. Treynor Ratio indicated that ICICI bank and Kotak Mahindra bank has generated 0.13% and 0.12% of return for every 1% risk taken whereas, YES bank has given negative returns of -1.37% for the investors.

#### Findings:

- 1) Amongst the stocks of pharma sector, Divi's Laboratories has outperformed having Treynor ratio of 0.47%, Sharpe ratio of 1.33% and with highest portfolio return of 47.65%.
- 2) Bajaj FinServ has performed well with 1.15% of Treynor ratio and Bajaj Finance having a Sharpe ratio of 1.01% and also has a highest portfolio return of 45.41% among the stocks in finance sector.
- 3) In the IT sector, L&T is the best performed stock with 0.56% Treynor ratio, Mind Tree has outperformed with 1.39% of Sharpe ratio and has highest portfolio return of 56.55%.
- 4) ICICI bank is best performed stock with 0.13% of Treynor ratio and 0.44% of Sharpe ratio and also with highest portfolio return of 20.56% among banking sector stocks.

#### Conclusion:

Indian stock market is a mixture of stocks from various sectors. Not all the company's stocks are favourable for investing. One should know to find the best stocks to invest his/her money because stock market involves various risk factors. The best stocks can be found by proper analysis. The analysis can be both technical and fundamental. In this study the stocks are analysed on the basis of various parameters like standard deviation, beta, portfolio return, Treynor ratio and Sharpe ratio. Standard deviation and beta show the volatility of the selected stocks. Whereas, Treynor ratio and Sharpe ratio shows the percentage of return of the stocks for every 1% risk taken by the investors. Taking Treynor and Sharpe ratio into consideration we can find the best performed stocks for the particular period of time in the chosen sectors. Well performed stock in the past is considered to be performing the same in the future. With the given time frame and the market conditions stock of Divi's Laboratories, Bajaj Finance, Mindtree and ICICI bank could have been a preferred investment decision.

#### Limitations of the Study:

The current study has taken into consideration the five-year time period from 1<sup>st</sup> April 2017 to 31<sup>st</sup> March, 2022 which is inclusive of the Pandemic period and hence the market conditions have a greater impact on the decisions or suggestions made in this study. The adaptation of the same parameters with the present market conditions may have a different impact for similar kind of study and hence the results cannot be generalised.

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# Supply Chain Management in Pharmaceutical Sector

DIVYA.A  
SCHOOL OF MANAGEMENT

## **ABSTRACT**

*The pharmaceutical sector discovers, develops, produces and markets drugs for use as medications to be administered to patients. Supply chain management is the management of the flow of goods and services which includes all processes that transforms raw materials into final products. The pharmaceutical supply chain involves wide variety of stakeholders including suppliers, wholesale distributors and pharmacy managers. The purpose of the study is to maintain inventory at different levels in supply chain management. The research methodology used is mailed questionnaire method at different district levels considering Bangalore. Research findings are the moving stock of drugs and non- moving stock of drugs at different levels by demand of drugs. As a result, supply chain management can transform the organization to make better use of assets and resources to enhance shareholder value and to positively respond to customer demand.*

## **KEYWORDS**

Discovers, medications, stakeholders, pharmacy managers, inventory, customer demand.

## **1.Introduction:**

Supply chain consists of two (or) more organisations linked by material, info & financial flows. This involves two means for improving the competitiveness of supply chain. One is the closer integration (or) cooperation of organisations involved and other is the better coordination of material, info & financial flows. A firm may increase its competitiveness by fulfilling generally accepted customer service level at minimum costs.

The pharmaceutical industry discovers, develops, produces and markets drugs which are used as medications for patients. These are drug company which are licensed to research, develop, market and distribute drugs. Pfizer is the world's largest research based pharmaceutical company.

The PSC includes multiple government agencies, hospitals, clinics, drug manufacturers, drug distributors, pharmacy chains, retailers and research organisation.



## **Fig 1: FLOW OF DRUGS IN PHARMACEUTICAL SECTOR**

### **2.Theoretical background of the study:**

#### 2.1 Need of Study:

The study's goal is to explore and evaluate the software glitch in the supply chain management. The outcome of the study assists the stockist in developing marketing strategies and adds on the value of research and knowledge in pharmaceutical sector of supply chain management

#### 2.2 Objectives of Study:

The purpose of the study is,

- (a) To maintain inventory at different levels in supply chain management.
- (b) To evaluate supply chain sustainability.
- (c) To identify barriers and challenges of supply chain at different levels.
- (d) To understand supply chain management.

#### 2.3 Scope of the study:

The concept of supply chain management is influenced by varied factors related to planning, logistics, operations, procurement, inventory management, transport, warehousing, distribution, customer service, etc. Drug supply chains are often global; China is the largest supplier of active pharmaceutical ingredients around the world.

#### 2.4 Research Methodology

The approach and strategies used in the research process to visualise the results of such study in a well-organised and appealing manner are referred to as research methodology.

##### 2.4.1 Type of Research

Exploratory inquiry is used in this approach of learning. Exploratory research is defined as research carried out to understand more about an undefined problem. It is carried out to gain a better understanding of the current issue.

##### 2.4.2 Sources of Data

**Primary Data:** The data that is collected by a researcher from first-hand sources, using methods like surveys, interviews, or experiments. It is collected with the research project in mind directly from primary sources.

**Secondary Data:** It refers to data that is collected by someone other than the users.

##### 2.4.3 Sampling

In this research, Convenience Sampling is used. Convenience Sampling is collecting the data based on their accessibility and availability, majorly with respect to the proximity and representativeness. This is an easy and inexpensive way to gather data as the data source is available at our convenience.

#### 2.4.4 Sample Size

Sample size is a total number of samples selected from the selected population. Sampling size for this study is 50 random people from various stockist and retailers from Bangalore.

#### 2.4.5 Tools for Data Collection

The Mailed Questionnaire Method was employed in this investigation. Mailed Questionnaire is a type of questionnaire that is mailed to a certain demographic with the expectation that they will respond to the questions with good reasoning in order to offer the researcher with helpful information for this study.

#### 2.4.6 Literature Review

The author tells us about the continuous advancements in pharma industry carried on by research and development professionals. The projects are done on the parameters like risk, ambiguity and non-routine. This study is applicable to 57 pharma firms which examines the organisational control on research and development. This study emphasis on input, behaviour and output controls. The author developed hypothesis for the study which resulted in the increase of innovation, input and output control. Overall results give out the important models on research and development.

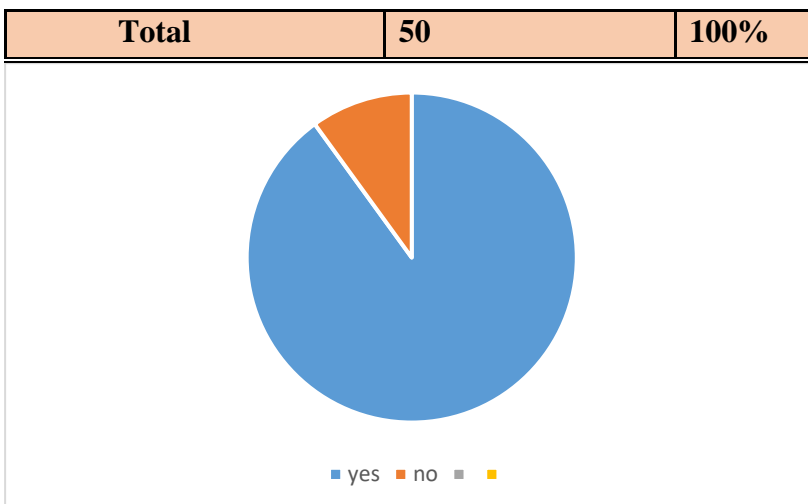
Ruud E.H.M.SmitsWouter et al explains the technological advancements in pharmaceutical industry by means of linear model. From the past two decennary the model has lost its importance. Through which technological innovation has rising costs, increased development and more demand for its stakeholders. The study has carried on by cases such as systematic model and its effects in present day scenario. The study resulted in systematic approach in technological advancements by the help of stakeholders i.e., policymakers, researchers and different firms.

Margareta Teodorescu Et al Gives an overview of technological advancement by a method of blockchain. This method was implemented by numerous companies over past 10 decades. The authors explain the difficulty in the implementation of block chain in logistics which results in increased financial costs. The study was based on research methodology with the help of case study relating to different geographical areas. It also focused on 3 levels of supply chain such as upstream, production and downstream. The analysis resulted in the implication of supply chain management by technical advancements.

Liz Breen et al tells us that supply chain management i able to be maintained at certain rate or level in recent scenario of busiest sector. Through sustainability we get to know the financial position and the smooth flow of pharma business. To maintain a level is the biggest challenge for the pharmaceutical sector. Issues such as flexibility of patient needs, competitors, agencies help in non-sustainability of supply chain management. The purpose of the study aims at sustainability applied to Pharmaceutical supply chain.

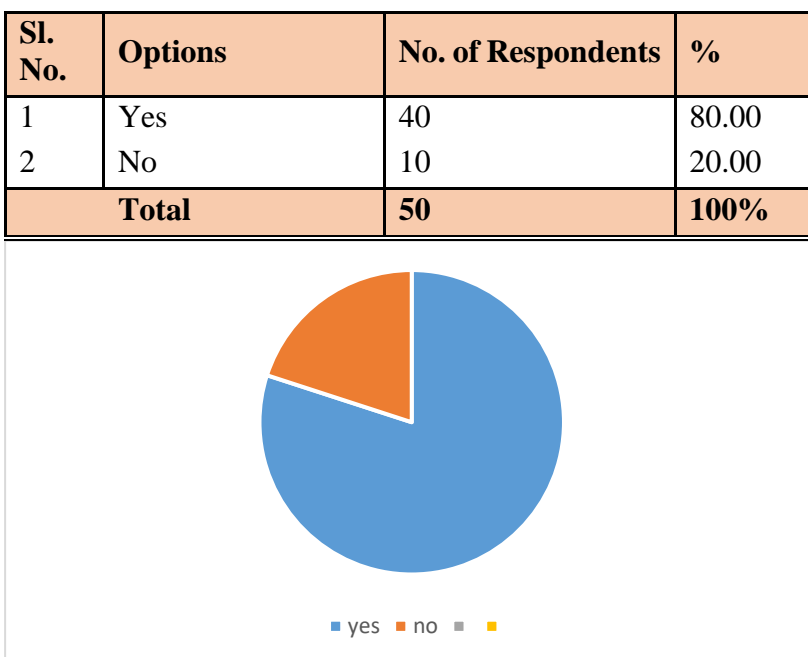
**TABLE 1: Is the stockiest using software for placing the order**

Sl. No.	Options	No. of Respondents	%
1	Yes	45	90.00%
2	No	05	10.00%



The above table shows that majority of stockists use software for placing orders.

**TABLE 2: Will the orders be delivered on time.**



The above table shows that delivery of drugs are on time through the use of software.

Table 3: Is the stockist satisfied with the working of the present software.

Sl. No.	Options	No. of Respondents	%
1	Yes	45	90.00
2	No	05	10.00
<b>Total</b>		<b>50</b>	<b>100%</b>



The above table shows the satisfaction of using the software but requires improvisation in the software.

### 3. Findings:

- Majority of the stockists prefer improvising the software.
- Most of them faced issues regarding software.
- Retailers can order by using the software.

### 4. Suggestions:

- More number of stockists and retailers face software glitch. Hence they have to adopt and try to do some research and develop regarding various software.
- Most of the people faced issues relating to slow webpage response time.

### 5. Conclusion:

From this study we can get to know that the demand for modern technology is increasing in various fields, especially in the field of pharmaceutical sector. This increase has created a greater impact on the demand for various drugs even beyond boundaries of the nation.

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# Corporate Social Responsibility and Future Managers – A Perception Analysis

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## **ABSTRACT**

*The objective of this study is to find out the different groups of components influencing the perceptions of the future managers towards Corporate Social Responsibility (CSR). A survey through the self administered questionnaire on ten statements of CSR has been conducted among 200 post graduate management students spread over 20 management colleges in Warangal District of the state of Andhra Pradesh. The responses have been analyzed through Factor Analysis with the help of SPSS-17. The analysis resulted in grouping the ten statements into three factors – CSR Practices, CSR Approach, and CSR Viewpoint. Five components constituted CSR Practice factor which showed high factor score at 8.2 indicating it's prominence in framing the perceptions, followed by another three components grouped into the factor of CSR Approach with a factor score of 4.814. Another two components are grouped into a third factor – CSR Viewpoint, which showed a score of 1.022. Finally, the study concludes that the CSR practices are the influencing components of perceptions among future managers regarding CSR.*

**KEYWORDS:** Perceptions, Corporate Social Responsibility (CSR), Future managers, Indian business, Factor Analysis

# A Reinvestigation of Career Aspirations and Their Influence on Individual Performance of Employees in A Post Covid- 19 Scenario with Special Reference to IT and ITES

*Submitted by*

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## **Summary of Proposed Research**

*Individual career aspiration refers to the individual's desire for future employment. Career aspirations represents dreams that individual have about ideal characters that would match their aspirations. Career Aspiration is important for they help us gain a deeper insight into our strength and weakness, moreover during difficult and trying times, they help us concentrate on a larger picture. It must also be noted that career aspirations are a rigorous, meticulous and earnest affair that shall make an individual self-confident and independent in and through their transactions on a longer term.*

*Talent Management is a great challenge; this is particularly true when it comes to IT/ITES industry. The IT sector requires highly skilled employees and at times these employees are unavailable. Career is a chosen pursuit called as one's chosen profession. It is about one's working life towards professional achievement. Career satisfaction is dealing with multiple factors that include Social cultural aspects (demographics), human capital in terms of education, tenure and foreign credentials.*

**Keywords:** Career, Career Aspiration, Career Satisfaction, Talent Management, etc.

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# Disruptions in IT Domain and Professionals Response to the Amendments– Evidence from Covid-19 Pandemic

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## **Abstract**

*The COVID 19 has severely affected all the industries across the continents. The unprecedented pandemic has affected the world economy badly. The study was carried out to explore the Perception of IT professionals on the combat measures taken by their organization, to explore the work-from-home setting and the perception on returning to work among IT professionals, to examine the perception of job insecurity that the IT professionals due to this pandemic crisis and to investigate the impact of Work place amendments on the Psychological health and safety of the IT professionals. The sample size of the study was 363 which were collected from the IT professionals. The descriptive statistics, t-Tests, ANOVAs, correlation and regression has been used to analyse the data. The results indicates the importance of the impact that Work from home has positively on the psychological health and safety and job insecurity having the negative effect on the health and safety of the IT professionals. The respondents have an aversion towards returning to work on immediate basis. Hence it was recommended that focusing on the return to work alone is not a viable option, as it will not allow organizations to capitalize on all that they have experienced and learned over the past few months as it may affect the climate of the organisation as such. "Dynamic stability" can be adapted. Remote working can be adapted for long term basis and this may proffer Indian companies a solid lever to tap into right talent globally devoid of location constraints.*

**Keywords:** Work from home; Return to work; Psychological health and safety; Job Insecurity; Organisational combat measures.

## **Introduction**

The pandemic COVID 19 has severely affected the global macroeconomic stance for the financial year 2020-21. This has banged the majority of the countries across the globe. The various economic activities got stagnated with the disruption in the global supply chain and trade. (SIRU, Investindia, 2020). The unprecedented pandemic has affected the Indian economy adversely. Almost all sectors take the downsizing in their hands to fight the struggle. Some fields get impacted badly like aviation, retail, travel, hospitality and discretionary consumer spends due to the lockdown. (ACN News, 2020)

The IT industry has been contributing much to the Indian economic growth for the past two decades. This industry has played a great role in realising Indian Middle class dream of prosperity. This has immensely contributed towards the global recognition for the Indian youths. Though the industry faces with the number of problems throughout, still it comes out strongly with the adaptive strategies. Many global companies depend on the Indian IT for their critical projects. This pandemic crisis has severely tested the industry's recovery strategies still done a remarkable job by rapidly offering the work from home for the employees. (Nagaraja Rao P. V, 2020)



The continued sharp decline in working hours globally due to the COVID-19 outbreak means that 1.6 billion workers in the informal economy – that is nearly half of the global workforce – stand in immediate danger of having their livelihoods destroyed (ILO press release, 2020). The IT companies in United states allows the employees to work from home and also seeking for new recruitment employees across the continents and letting them work remotely for the long term. The trend is generating a much intense supply of chief candidates for, several of whom are hesitant to move to a diverse city or state because it could interrupt a spouse’s career or a child’s schooling. (Paul Davidson, 2020). The Corona virus pandemic has led to largest number of employees internationally bound to work remotely. The citizens in many countries including India are advised to stay at home and to lessen social contacts to a least in the wake of the outbreak of the pandemic COVID-19. The concept of work from home got more popularity at this point followed not only by IT arena but by many fields (Shareena & Shahid, Mahammad, 2020).

COVID-19 has challenged business leaders to do three things at once: stage the return to work, understand and leverage the advancements they enacted during the crisis, and chart a new path forward. Leading organizations will do the same. Rather than shrinking from, or preparing to fight, the oncoming storm of change, they draw energy from it. In the context of COVID-19, they will leverage the opportunity to return to work by designing the future of work; employing the lessons, practices, and goodwill they built during their accelerated crisis response. (Erica Volini et al, 2020). The COVID-19 pandemic will affect the mental health and wellbeing of employees well beyond the immediacy of the initial crisis.

The objectives of the study includes the study of Perception of IT professionals on the combat measures taken by their organization, to explore the work-from-home setting and the perception on returning to work among IT professionals, to examine the perception of job insecurity that the IT professionals due to this pandemic crisis, to investigate the impact of Work place amendments on the Psychological health and safety of the IT professionals.

### Methodology

The IT Professionals are the population of the study. The data collection was done using online survey. As the size of the population is unknown, the sample size calculation was done by referring g the Cochran’s (1977) sample size formula. Having 95% of confidence level the ideal sample size would be 384 according to Barlett et al., 2001. The Study was carried out in the period of May 2020 to July 2020. The Various social media platforms were used to catch-up with the IT professionals and the questionnaire received 378 responses out of which 363 were found useful and complete.

The questionnaire was based on the six major themes where the first part covers the demographic characteristics. The subsequent parts were the main constructs like Organisational combat measures, Work-from-home, Return to work, Job Insecurity and Psychological Health and Safety. The responses to the items were constructed using 5-point scale Likert scale. The higher score indicates the stronger agreement and vice versa.

**Table 1. Questionnaire Construct and Validity**

Variables	Constructs	$\alpha$	N of Items
OCM	Our organization has taken proper action in response to COVID-19.	0.844	7

	Management does a good job of sharing information regarding COVID-19.		
	Management cares about my health and safety.		
	I am fully aware of how COVID-19 will affect my role at the organization.		
	I have confidence in the organizations ability to overcome the challenges faced by COVID-19.		
	I feel comfortable communicating concerns or making suggestions about COVID-19 to the Management.		
	Systems are in place to enable social distancing at our organization.		
WFH	I have access to the things I needed when working remotely.	0.943	7
	I am able to be just as productive while working remotely when compared to my usual work location.		
	I have the materials and equipment I need to perform effectively at home/remotely.		
	I have the technology I need to help me stay connected to my team when working remotely.		
	While working remotely, I have a working space where I can focus on work.		
	Our organization encourages new methods of working and communicating to improve team productivity.		
	Work from home saves the time take for travel and thus I can use it productively		
RTW	I understand the recently updated organizational health and safety policies and procedures that have been put in place.	0.733	6
	I understand what is expected of me in maintaining a healthy and safe environment at work.		
	I am comfortable returning to my work place		
	I am comfortable travelling for work if required.		
	I am comfortable commuting through public transit to work.		
	I would not prefer to work from home if that option was extended to me.		
JIS	I feel that I may lose my job at anytime	0.850	4
	The engagements of contract based workers are threat to full time employees		
	The full package of the salary is not getting credited		
	I feel that I should have a backup plan in case if I get terminated		
PHS	I am informed about important changes at work in a timely manner.	0.963	8

I receive useful and timely feedback from my organisation		
I feel comfortable to voice my opinion, even when it differs from the group opinion		
Difficult situations at work are addressed effectively		
The amount of work I am expected to do is reasonable for my position.		
The environment at this organization supports a balance between work and personal life.		
My work is free from unnecessary interruptions and disruptions.		
I have the freedom to make decisions about my work.		

OCM= Organisational Combat Measures ; WFH = Work-from-Home; RTW= Return to work; JIS = Job Insecurity; PHS= Psychological Health and Safety

The internal consistency reliability was made certain, the chronbach alpha value for the constructs are presented in the table 1. All the scales have the alpha value greater than 0.7 and hence ensures the higher internal consistency for the variables. (Hair et al. 2006)

**Table 2. Normality**

Variables	OCM	WFH	RTW	JIS	PHS
<b>x</b>	3.806	3.658	3.307	3.149	3.390
<b>σ</b>	0.815	1.003	0.552	0.977	1.063
Skewness	-0.170	-0.750	0.021	0.324	-1.134
Kurtosis	-0.915	-0.163	-1.136	-0.084	0.451

Note: S.E for Skewness =0.128, S.E. for Kurtosis =0.255

The normality was analysed by skewness and kurtosis. According to Tabachnick & Fidell (2001) and Garson (2006) when the data gets normally distributed then the skewness and kurtosis would be in the range of 2 to -2. The table 2 shows the values of the mean and SD of the variables also.

**Results**

**Table 3. Demographic Characteristics**

S.No	Demographic Profile	Number of Respondents (N=363)	Percent (%)
1	<b>Age of the Respondents</b>		
	Below 25	70	19.3
	25-35	234	64.5
	36-45	59	16.3
2	<b>Marital Status</b>		
	Single	176	48.5
	Married	187	51.5
3	<b>Family Type</b>		

S.No	Demographic Profile	Number Respondents (N=363)	of Percent (%)
	Joint Family	80	22.9
	Nuclear Family	283	77.1
4	<b>Qualification</b>		
	UG – Arts, Science and Management	18	5
	UG- Engineering	170	46.8
	PG- Arts, Science and Management	67	18.5
	PG - Engineering	108	29.8
5	<b>Experience</b>		
	Less than 2 years	36	9.9
	2-5 years	149	41.0
	5-10 years	176	48.5
	More than 10 years	2	0.6
6	<b>No.Of Family Members</b>		
	upto 2	31	8.5
	3 to 4	274	75.5
	5 to 7	56	15.4
	More than 7	2	0.6

From the total respondents (n=363) majority belongs to the age group of 25 – 35 and about 51.5% are married. Majority of the respondents are from Nuclear family with the number of family members of 3 to 4 (75.5%). About 76.6% of the respondents are from engineering background where 46.8% are under graduates and 29.8% are post graduates in engineering. Majority of the respondents are with the experience of 5 to 10 years.

**Table 4. Independent t-Test I**

Family Type	N	$\bar{X}$	$\sigma$	t	d.f.	Sig.	
<b>OCM</b>	Joint Family	83	4.0792	0.55743	3.537	361	0.000
	Nuclear Family	280	3.7245	0.86108			
<b>WFH</b>	Joint Family	83	4.2341	0.72452	6.263	361	0.000
	Nuclear Family	280	3.4872	1.01181			
<b>RTW</b>	Joint Family	83	3.5100	0.55421	3.884	361	0.000
	Nuclear Family	280	3.2470	0.53807			
<b>PHS</b>	Joint Family	83	3.9864	0.57249	6.105	361	0.000
	Nuclear Family	280	3.2134	1.10994			
<b>JIS</b>	Joint Family	83	3.0271	0.54383	-1.292	361	0.197
	Nuclear Family	280	3.1848	1.07075			

From the table 4 it is understood that there is significant difference in the perception of the Organisational Combat Measures ( $t(361) = 3.537, p < 0.01$ ), Work-from-Home ( $t(361) = 6.263, p < 0.01$ ) Return to work ( $t(361) = 3.884, p < 0.01$ ) and Psychological Health and Safety ( $t(361) = 6.105, p < 0.01$ ) between respondents from joint family and nuclear family. And there is no difference between the perception of Job Insecurity ( $t(361) = -1.292, p > 0.05$ ) between the two groups.

**Table 5. Independent t-Test II**

Family Type	N	$\bar{X}$	$\sigma$	t	d.f.	Sig.	
<b>OCM</b>	Single	176	3.5901	0.92984	-5.050	361	0.000
	Married	187	4.0084	0.62747			
<b>WFH</b>	Single	176	3.2119	1.16539	-9.101	361	0.000
	Married	187	4.0779	0.56178			
<b>RTW</b>	Single	176	3.2036	0.60531	-3.521	361	0.000
	Married	187	3.4046	0.47860			
<b>PHS</b>	Single	176	2.9141	1.32348	-9.184	361	0.000
	Married	187	3.8382	0.36579			
<b>JIS</b>	Single	176	3.5384	1.13245	7.981	361	0.000
	Married	187	2.7821	0.61098			

Note: OCM= Organisational Combat Measures ; WFH = Work-from-Home; RTW= Return to work; JIS = Job Insecurity; PHS= Psychological Health and Safety

Looking into the table 5 it is evident that there is significant difference in the perception of the Organisational Combat Measures ( $t(361) = -5.050, p < 0.01$ ), Work-from-Home ( $t(361) = -9.101, p < 0.01$ ) Return to work ( $t(361) = -3.521, p < 0.01$ ), Psychological Health and Safety ( $t(361) = -9.184, p < 0.01$ ) and Job Insecurity ( $t(361) = 7.981, p < 0.01$ ) between respondents who are single and married.

**Table 6. ANOVA I**

		Sum of Squares	df	Mean Square	F	Sig.
<b>OCM</b>	Between Groups	12.322	2	6.161	9.725	.000
	Within Groups	228.080	360	.634		
	Total	240.403	362			
<b>WFH</b>	Between Groups	8.394	2	4.197	4.244	.015
	Within Groups	355.987	360	.989		
	Total	364.381	362			
<b>RTW</b>	Between Groups	10.538	2	5.269	18.996	.000
	Within Groups	99.853	360	.277		
	Total	110.390	362			
<b>PHS</b>	Between Groups	20.661	2	10.330	9.580	.000
	Within Groups	388.193	360	1.078		
	Total	408.854	362			

<b>JIS</b>	Between Groups	10.320	2	5.160	5.538	.004
	Within Groups	335.397	360	.932		
	Total	345.717	362			

Note: OCM= Organisational Combat Measures ; WFH = Work-from-Home; RTW= Return to work; JIS = Job Insecurity; PHS= Psychological Health and Safety

Table 6 presents the results of ANOVA test according to the Age. The result indicated that there is a difference in Perception of the IT professionals in the Organisational combat measures ( $F(2, 360) = 9.725, p < 0.01$ ), Work from home ( $F(2, 360) = 4.244, p < 0.05$ ), Return to work ( $F(2, 360) = 18.996, p < 0.01$ ), Psychological health and safety ( $F(2, 360) = 9.580, p < 0.01$ ) and Job Insecurity ( $F(2, 360) = 5.538, p < 0.01$ ) among the different groups of age.

**Table 7. ANOVA II**

		Sum of Squares	df	Mean Square	F	Sig.
<b>OCM</b>	Between Groups	38.415	3	12.805	22.758	0.000
	Within Groups	201.988	359	0.563		
	Total	240.403	362			
<b>WFH</b>	Between Groups	96.904	3	32.301	43.354	0.000
	Within Groups	267.477	359	0.745		
	Total	364.381	362			
<b>RTW</b>	Between Groups	21.422	3	7.141	28.814	0.000
	Within Groups	88.968	359	0.248		
	Total	110.390	362			
<b>PHS</b>	Between Groups	142.613	3	47.538	64.100	0.000
	Within Groups	266.241	359	0.742		
	Total	408.854	362			
<b>JIS</b>	Between Groups	65.908	3	21.969	28.187	0.000
	Within Groups	279.809	359	0.779		
	Total	345.717	362			

Note: OCM= Organisational Combat Measures ; WFH = Work-from-Home; RTW= Return to work; JIS = Job Insecurity; PHS= Psychological Health and Safety

The results for the indicated significant differences in perceiving the Organisational Combat Measures ( $F(3, 359) = 22.758, p < 0.01$ ), Work from home ( $F(3, 359) = 43.354, p < 0.01$ ), Return to work ( $F(3, 359) = 28.814, p < 0.01$ ), Psychological health and safety ( $F(3, 359) = 64.100, p < 0.01$ ) and Job Insecurity ( $F(3, 359) = 28.187, p < 0.01$ ) among the different groups of the experience that they possess in the field.

**Table 8. ANOVA III**

		Sum of Squares	df	Mean Square	F	Sig.
<b>OCM</b>	Between Groups	17.421	3	5.807	9.349	0.000
	Within Groups	222.982	359	0.621		
	Total	240.403	362			

<b>WFH</b>	Between Groups	24.249	3	8.083	8.531	0.000
	Within Groups	340.132	359	0.947		
	Total	364.381	362			
<b>RTW</b>	Between Groups	1.174	3	0.391	1.286	0.279
	Within Groups	109.217	359	0.304		
	Total	110.390	362			
<b>PHS</b>	Between Groups	55.622	3	18.541	18.843	0.000
	Within Groups	353.232	359	0.984		
	Total	408.854	362			
<b>JIS</b>	Between Groups	32.575	3	10.858	12.448	0.000
	Within Groups	313.142	359	0.872		
	Total	345.717	362			

Note: OCM= Organisational Combat Measures ; WFH = Work-from-Home; RTW= Return to work; JIS = Job Insecurity; PHS= Psychological Health and Safety

When testing the difference in the perception of the IT professionals in terms of Education, there is a difference between the groups in perceiving the Organisational combat measures ( $F(3, 359) = 9.349, p < 0.01$ ), Work from home ( $F(3, 359) = 8.531, p < 0.01$ ), Psychological health and safety ( $F(3, 359) = 18.843, p < 0.01$ ) and Job Insecurity ( $F(3, 359) = 12.448, p < 0.01$ ). And there is no significant difference among the different groups of education in perceiving the Return to work ( $F(3, 359) = 1.286, p > 0.05$ ).

**Table 9. Correlation**

Variables	$\bar{X}$	$\sigma$	OCM	WFH	RTW	PHS	JIS
<b>OCM</b>	3.81	0.81	1	<b>.707**</b>	.417**	<b>.700**</b>	<b>-.669**</b>
<b>WFH</b>	3.66	1.00		1	.523**	<b>.873**</b>	<b>-.713**</b>
<b>RTW</b>	3.31	0.55			1	.634**	<b>-.437**</b>
<b>PHS</b>	3.39	1.06				1	<b>-.817**</b>
<b>JIS</b>	3.15	0.98					1

OCM= Organisational Combat Measures; WFH = Work-from-Home; RTW= Return to work; JIS = Job Insecurity; PHS= Psychological Health and Safety

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

\*. Correlation is significant at the 0.05 level (2-tailed).

The coefficient of correlation among the independent and dependent variables are shown in the table 9 and the values in the table 9 ranges from 0 to 1. The mean and SD of the variables are displayed in the second and third column. It is to be noted that Work from Home variable has significant positive relationship with Psychological Health and Safety. Job Insecurity is negatively correlated with all other variables of the study like Organisational Combat Measures, Work from Home, Return to Work and Psychological Health and Safety. Psychological Health and Safety has a strong negative correlation with Job Insecurity. Organisational Combat Measures and Work from Home have a moderate negative correlation with Job Insecurity. Organisational Combat Measures has a strong correlation with Work from Home and Psychological Health and Safety. Return to Work has a moderate positive relationship with Psychological Health and Safety and Work from Home.

**Table 10. Multiple Regression**

Predictors	Standardised Coefficient	
	PSH	JIS
<i>Model 1</i>		
OCM	0.026	
WFH	0.487***	
RTW	0.211***	
JIS	-0.360***	
<i>Model 2</i>		
OCM		-0.203***
WFH		0.100
RTW		0.132**
PSH		-0.854***
R <sup>2</sup>	0.872	0.698
Adjusted R <sup>2</sup>	0.870	0.695
Total F	607.044***	207.026***
dfs	4, 358	4, 358

Note: OCM= Organisational Combat Measures ; WFH = Work-from-Home; RTW= Return to work; JIS = Job Insecurity; PHS= Psychological Health and Safety

\*p<0.05; \*\*p<0.01, \*\*\*p<0.001

The table.10 presents the results of regression analysis. The results of the model 1 shows that about 87.2% of the variation in the Psychological safety and health is explained by the sample regression plane that uses Work from home ( $\beta=0.487$ ,  $p<0.001$ ) , Return to work ( $\beta=0.211$ ,  $p<0.001$ ) and Job insecurity ( $\beta= - 0.360$ ,  $p<0.001$ ) as the independent variables. Whereas organisational combat measures ( $\beta= -0.203$ ,  $p<0.001$ ), Return to work ( $\beta=0.132$ ,  $p<0.01$ ) and psychological safety and health ( $\beta= -0.854$ ,  $p<0.001$ ) were significantly related to the Job insecurity.

## Discussion

The knowledge about how the pandemic will affect the professionals’ role in organisation is prominent. It is opined that the management of the IT firms does a commendable job in sharing the information regarding COVID- 19 to its employees. It is opined by most of them that the work from home saves the time that they take for travel and instead they use them productively and it yield better outputs. The Professionals also understood in a better way the recently updated health and safety policies of the organisation. Most of the employees would prefer to work from home if that option was offered to them. Also they opined that it is distressing to travel for the work if requested by the organisations and they do not feel comfortable commuting through public transit to work place. Focusing on the return to work alone is not a viable option, as it will not allow organizations to capitalize on all that they have experienced and learned over the past few months also it may affect the psychological health and safety of the employees. It would affect the climate of the organisation as such. Instead, we believe organizations should embrace New York Times columnist Thomas Friedman’s perspective that humans who want to adapt in an age of acceleration must develop “dynamic stability.”



Insecurity of job is more felt by the professionals who are single. Work from home is more preferred by the married professionals as they feel safe in home with the family, they seem to prefer being safe and sound. Singles might feel less comfortable in work from home as they miss the fun and companionship of the peers. Psychological health and safety is higher among the married professionals than that of singles. There is the significant difference between single and married professionals in perceiving the disruptions and the amendments. Work from home variable receives more interest among the professionals who hail from the joint family. This may be because there would be people in the family to take care of the children and other needs and hence they may have the privacy for their work, which is not possible in the nuclear family. Some of the dual career couples in the nuclear family struggle with the work from home circumstances as they do not have any hands for help. They get to do their household chores, take care of their kids and as well as attend to the professional chores which make them feel that work from home is not an option to foresee. Job insecurity has the significant negative correlation with the Psychological health and safety. Hence the organizations should take necessary care in ensuring that their employees feel secure about the job.

In order to have the employees rich in psychological health and safety in this pandemic times, work from home setting is the key for the organizations as the two variables has significant positive relationship. The combat measures taken by the organisations have a positive impact on the psychological health safety of the employees in the IT sector. It is also important to note that the employees giving importance to the Work from home has negative relationship with the Job insecurity. It is understood form the regression model that in order to prevent the psychological health and safety the organisations must consider to extent the Work from home option for the professionals and thereby it averts the feel of job insecurity during these unprecedented times of COVID-19. There may not be any resist for the 'work from home' for offshore as they have seen how impeccably it helped during the pandemic. However the organisations may increase the security controls on such remote working to prevent the data breach and security threats. This adaptable remote working model may proffer Indian companies a solid lever to tap into right talent globally devoid of location constraints.

## **Conclusion**

COVID-19 hits every news channel, every memes in social networks, every message that gets forwarded, every talk that we hear, every thought that we process, hence the study related to the disruptions and its implications is the need of the hour. As the limitation this study was conducted in only India and findings may not be generalized to the other countries. A limitation of this study was our use of cross-sectional data which precluded attribution of causality. Researchers are yet to explore the impact of the disruption in other fields of industries too. As the situation by itself is novel, the need for further research can throw more light. As the survey was conducted online there might be systematic differences among the respondents and even over the period of time. Hence longitudinal studies may give more robust outcomes.

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## A Conceptual study on Green HRM Practices and its impact on Job satisfaction

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### **ABSTRACT:**

*One of the most pressing concerns in today's business environment is green human resource management. Employee resistance, a lack of employee awareness, employee job satisfaction, and a lack of top management support are all obstacles to implementing green HRM practices. As a result, there is a lot of pressure on businesses to adopt methods that are more likely to support environmental behaviour, making people happier in their jobs because of their company's commitment to environmentally friendly practices. As a result, HR procedures must be developed to reflect sustainability in all of their activities. Organizations, academicians, and researchers are unfamiliar with the notion of green hrm. This study aims to close the gap by providing knowledge and a better understanding of green hrm and green hrm practices. This is a conceptual paper that explains the concept of green hrm, green hrm practices, and their impact on employee satisfaction. Green recruiting and selection, green training and development, green performance management, and green rewards are all discussed in this study. Green HRM practices have a beneficial effect on employee work satisfaction, and there is no correlation between green HRM practices and job satisfaction.*

**Key words:** Green hrm, green hrm practices, job satisfaction

### **INTRODUCTION:**

Climate change is the hot topic in the recent past because of its adverse impacts on both ecology and human life. The organizations desirous of more productivity are intending to satisfy its employees. Creating innovative policies and rules for the benefit of the employees and organisation is the pivotal role of human resource management. Due to high usage of natural resources, organisations started to adopt green activities to save the nature. That implementation of green activities can possible by the human resource management.

The problem we are attempting to conquer is determining how to please employees while simultaneously engaging them in green practices and rules, which is a difficult assignment for HR people. This study illustrates how green HRM practices increase employee satisfaction. Only happy personnel are enthusiastic about environmentally beneficial methods. Green HRM may be implemented more effectively in firms if Green Practices are combined with human resource management. The purpose of the study is to determine

the influence of green HRM practices on job satisfaction of employees. Green human capital will be created and developed through green HR practices and policies. Employees that are satisfied feel more responsible for the environment and are more committed to green projects. They also do their work more efficiently, which improves environmental performance. A happy and satisfied employee will be committed to the environment and will make the best use of resources in order to lessen the negative impact on Mother Nature. Green HRM techniques including green recruitment and selection, green training and development, green rewards and compensation, and green performance management, increase employee satisfaction with green activities while also promoting social responsibility (Vanisri.K, and Seema.A,2021).

## **THE NEED FOR STUDY**

There are few studies on green hr and job satisfaction, despite the fact that there are several studies on the notion of green hr. There have been few studies on the impact of green HRM practices on employees satisfaction on job. Understanding the importance of Green HRM in firms and its influence on employees is a critical stage in the development of an efficient GHRM system (Ren et al., 2018). In view of this gap, the paper provides a conceptual framework on green human resource management, which directly ties green human resource management to job satisfaction. Furthermore, the study drew on relevant literature to identify four Green hr practices: green recruitment and selection, green training and development, green performance management, and green reward system, as well as future research efforts. This work is useful and piques the curiosity of potential scholars and even those who wish to learn more about the concept of green hr. The main aim of this study is to raise awareness about green HRM and how it influences employee job satisfaction. This paper main objective is to 1) To investigate the impact of green HRM practices on employee job satisfaction. 2) To know the connection between green HRM and employee job satisfaction.3). To study the employees job satisfaction level. Green HRM aims to reduce environmental exploitation while accessing and using natural resources. Green HRM techniques help both people and organisations, as well as improving resource efficiency, business reputation, and economic and environmental performance. It creates a pollution-free society by removing air pollutants, improving the quality of the air we breathe, and promoting good health. It also has a lower negative influence on the environment. Environmentally friendly methods help to rescue the earth. Furthermore, by producing job possibilities, it supports and promotes the economy. It is critical in lowering severe temperatures and unnatural climatic fluctuations, which emit carbon components and contribute to global warming. Green HRM activities contribute to organizational sustainability and bring benefits to the organization and society by conserving natural resources, lowering carbon footprints, and reducing paper usage. Integration of green practices with HR helps firms achieve their environmental goals while also improving their sustainability and competitiveness.

Many companies are concentrating to implement green practices by replacing existing polluting utilities with eco-friendly alternatives viz., usage of cloth bags, carpooling of employees for commutation, minimizing the flow of waste into lakes, rivers etc., work from home to reduce vehicle pollution etc., The mentioned issues are concerned with global warming, minimal wastage of resources, climatic changes, pollution etc., In India, companies like Maruti, Delhi CNG, Suzlon Energy etc., are promoting green practices. (Cover & Thomas, 2005). Global companies like Disney, Fisher investment, Johnson and Johnson, Nike, Starbucks, Google, eBay support green hr practices to achieve environmental sustainability. These companies are focusing on the employees

satisfaction, boosting morale of employees by integrating hr practices with green management. (Hofmann et al., 2011, Clikeman, 2004).

### **REVIEW OF LITERATURE:**

Green HRM practices refer to aligning HR practices into Green to enhance responsiveness towards ecology and employees inclusiveness in achieving organization's green goals and practices. Among many green hr practices only a few such as green recruitment and selection, green training and development, green performance management and green rewards help to assess green conscious, creates awareness and motivate green behaviour among employees (Renwick et al., 2013).

Opatha and Arulrajha (2014) potted the basic Green HR functions. Some HRM Functions and Ways of Making them Green

#### **Green Recruitment:**

Recruitment messages depict environmental criteria

Communicate the employer's green preference through recruitment efforts.

#### **Green selection:**

Selecting the aspirants having green awareness in filling job vacancies.

Selecting the applicants engaged in greening as consumers in their personal life.

Conduct online interview to minimize the paper work and pollution.

#### **Green Training:**

Exclusively designed training programs on greening to impart right knowledge and skills about greening to every employee.

Training programmes are organized through online.

#### **Green Performance:**

Assessing employee 's job performance in relation with their green practices.

A separate component for development on greening in the performance feedback interview

#### **Green Rewards:**

Monetary incentives to employees based on green job performance.

Non-financial rewards such as momentos, commendations and letters of appreciation as recognition to their green contribution.

To define job satisfaction, it is the satisfaction derived by the employees from the job and workplace (Edwin A. Locke, 1969). An employee gets satisfied through self-motivating factors viz., the environment, job and organization they work (E.A. Locke, 1976). Employee job satisfaction can be measured in terms of the contentment and job engagement of the employees towards their job (Judge et al., 2002). Conspicuously the employees are the assets of any organization. The organizations shall make the employees engaged in their jobs and create interest in every aspect of their job and helps to retain the employees. All talents, skills and capabilities of satisfied employees can be utilized in full (Brayfield & Rothe, 1951). Satisfied employee by rendering his best efforts earns more salary, stability, career growth, understanding, incentives, rewards etc., from their job and in reciprocation the employer will be benefitted by satisfied employee constantly retains and attract the best employees and helps to enhance the growth of the company (Lok & Crawford, 2004).

Simple environmental, emotional and monetary aspects encourage and motivate employees towards job satisfaction viz., better working conditions, skill recognition, challenging tasks, relationship with colleagues, flexible work hours, nature of work, supervision, fair pay etc., (Judge et al., 2012).

Job satisfaction is a positive emotional state of one's job appraisal and experience. Many definitions of job satisfaction highlight the significance of employees 'job-related perceptions that link the expectations of them and what they receive in return.

There are 3 facets of job satisfaction that are: -

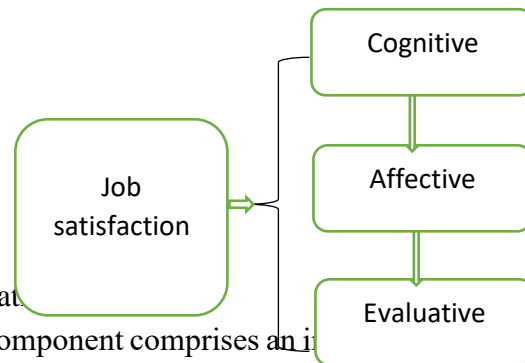


Fig 1: 3 facets of Job sat

Cognitive: Cognitive component comprises an individual's perception, opinion, belief and expectations towards the organization.

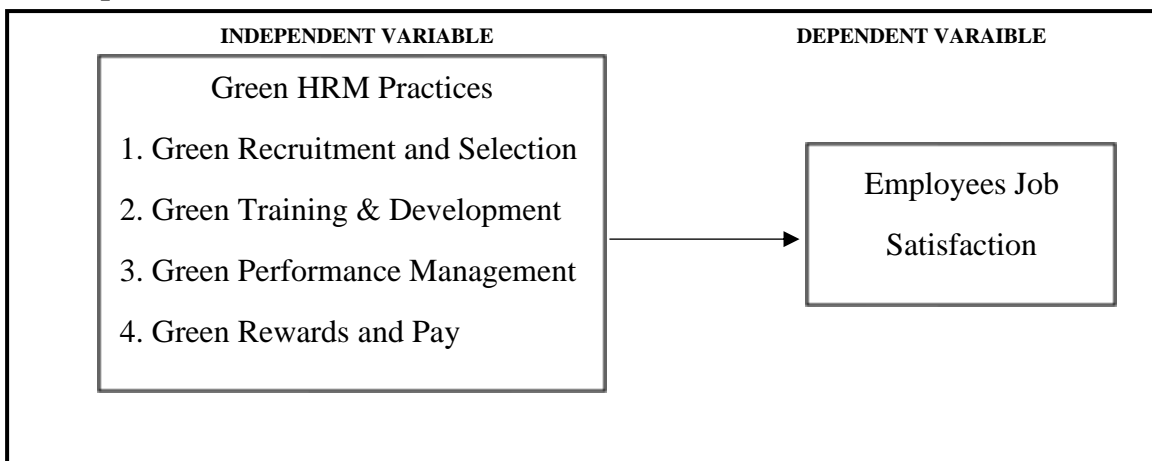
Affective: This component explains the feelings and emotions of the employee towards the organisation. Reviews, information and individual thinking are the positive effects affecting the whole situation. Self-worth means the feeling of an individual that his knowledge and skills are assets to the organization. (Thompson & Phua, 2012). It represents the feelings brought about by the organization. Positive effects are the outcome of information, feedback and circumstances that upholds and strengthens individual's self-worth, self-concept whereas negative effect is aroused by adverse situations.

Cognitive and affective components create huge impact in measuring the employees' job satisfaction.

Evaluative:

An individual employee's overall response towards the organization is considered as evaluative component. This response contains favourable and unfavourable conditions for the job or dislike vs like for the organization.

**Conceptual Framework**



In the study of Chan and Hawkins, it is stated that organisations which adopt and implement green hrm practices, create awareness on environment and show its positive impact towards society and mother earth. This environmental awareness makes the

employees to understand how this green hrM practices protect the planet and nature, provides a healthier and safer environment. The environmental goals and green values make employees feel that they are doing something meaningful task. This feeling of meaningful task results in job satisfaction (Chan and Hawkins, 2010).

The four important phases involved in implementing GHRM practices are environmental vision as a guide, providing training to employees on environmental goals and visions, evaluating employee environmental performance and recognizing and rewarding employees for their environmental activities (Clairet al., 1996). Analogously Daily and Huang (2001) proposed four ways of implementing green HRM which embraces managers' support, training, empowerment and rewards. The ways of implementing green HRM are in accordance with the core characteristics of job. More importantly, green HRM promotes skill variety, task identity and task significance by facilitating the employees to share environmental vision and goals and thereby training them to boost environmental awareness. The core characteristics of job psychologically stimulates the employees in comprehending the meaningfulness of their job and as such influences their attitude and perception towards their job satisfaction.

### **Green recruitment and Job satisfaction**

Firms are now making efforts to label themselves as Green Employers in order to attract new talent. (Phillips, 2007; Stringer, 2009). In the process of attracting employees, companies express certain environmental values in their job advertisements and also exhibiting a clear message in the advertisement regarding to the environmental concern working culture. Through Green Recruitment and Selection process, companies selecting right person for their job. The right person selected for the right job will create job satisfaction. If there is a mismatch of a person with green job or green working culture will lead to employee turnover problem. It is difficult to implement green practices in the organization if the employees do not have same values towards environment. Therefore, Green Recruitment will create direct impact on job satisfaction of employees.

### **Green Training and Job satisfaction**

The next important Green HRM practice is Green Training, a process of creating awareness on environment and increase the knowledge in environment management and environment related aspects of safety, energy efficiency, waste management and recycling (Prasad, 2013). Green Training makes employees to understand clearly the significance of Green practices and they try to implement in their jobs. Green Training imparts a comprehension about their jobs which leads to job satisfaction.

### **Green Performance and Job satisfaction**

Green Performance Management is a process of integrating environmental management into performance management system, which improves the quality and value of environmental performances. Through this process employers measure Green Performance of employees in their jobs. Based on the Green Performance, employees will get appreciation, recognition and rewards. This recognition and appreciation create job satisfaction among employees.

### **Green Rewards and Job satisfaction**

Green Rewards is the process of compensating the employees for their green behaviour on jobs through monetary and non-monetary ways. Green Rewards stimulates employees' green behaviour and make them to actively participate in green activities. This reward system will encourage employees enthusiasm towards their jobs and creates job satisfaction among employees. They can get green Rewards in the form of hike in salary, cash incentives, bonuses and benefits or perks while non-monetary rewards include sabbaticals, special leaves, gifts, recognition, letters of appreciation etc.,

A Green Organization utilizes human resources in an effective and efficient manner by creating a virtualized work space to optimize the use of company resources, providing flexible work hours, reducing and eliminating environmental waste. The results included: e-filing, carpooling, job sharing, teleconferencing and virtual interviews, recycling, telecommuting, online training, and developing more energy-efficient office spaces (Sharma, 2015). GHRM besides promoting the environmental awareness and conscious in the employees to boost their morale enhancing their job satisfaction, business enterprises should utilize the Human Resource Management policies for sustainable employment of resources (Mampra, 2013).

## **DISCUSSION:**

The primary purpose of the paper was to relate Green Human Resource practices with Job Satisfaction. The present study aids the organizations in designing HR policies aiming the employees perception and to make strategies to satisfy and retain the employees in the organization. Green hrm practices transpose traditional jobs into green jobs. Green jobs are decent jobs which involves the work in manufacturing and service sector in an ecofriendly way and completing the work process by using minimal natural resources thus reducing carbon emissions (oguz basol). Initially, job satisfaction contained 5 dimensions such as pay, nature of work, operating procedures, supervision and coworkers (Keser 2005). The meaning of job changed by introducing four dimensions in job satisfaction structure viz., promotion, fringe benefits, reward and communication (Spector 1985; 1997; Curriuan 1999; Friday and Friday 2003; Crossman and Abou-Zaki 2003)

The employees satisfied in the Green HRM policies instill an optimistic attitude to the environment which in turn benefits the society as a whole. A person with rightly perception towards his job will always be satisfied whether he is in his job or away. Dissatisfaction in job will have its adverse effects in job leading to absenteeism, distress, depression, erring in work, lesser productivity, lack of interest in performing to their abilities and also in many other aspects of personal life viz., family life, leisure activities etc., Happiness is after all the heart of human life which spins of the society.

Green performance appraisal and job satisfaction have no relation of any significance (Sonal singh, Dr.vikasnath,2020). The study integrated green hrm practices with job satisfaction. green discipline management in IT sector is a new Green HR practice added by Sonal Singh in his study to find out the relationship with job satisfaction. The findings proved that Green Recruitment is the most influenced Green HRM practice towards employees job satisfaction compared to other Green HRM practices. Hence, in order to implement Green practices effectively in the organization, recruiting practices such as paperless or online application should be implemented widely in all sectors of the organizations ( Fatini Kamaruddin etal., 2018). Green hrm practices make job characteristics into meaningful, which leads to motivation and job satisfaction (Spector, 1992). Employees satisfied in their job will be prepared to do anything for the advancement of the organisation which in turn leads to productivity.

## **CONCLUSION:**

Green HRM is thriving around the world. It will have a massive revolution and impact on individuals, corporations, and the rest of the globe. It not only provides a useful lesson to businesses, but also to future generations, about the need of treating nature and the environment with respect. This study indicates that green hrm practices are significantly related to employees job satisfaction. Incorporating a well-structured Green HRM policy in conjunction with the progress of green technology in corporations, banks, hospitals,



and academic institutions pays off handsomely over time. The payback of Green HRM not only yields strong results in business performance, employee productivity and morale but also create a brand image and better reputation in the eyes of society (Udaya Geetha, 2020). Also, implementing 'Green' in an organisation plays a vital role in creating the environmental and sustainability awareness through training to employees. Hence, there is a need for Green HRM practices and policies in every sector to make an extensive contribution by creating healthy working environment with special effort on retaining natural resources besides reducing environmental pollution (Udaya Geetha, 2020). Green goals and focused sustainability goals are difficult to attain without GHRM policies, processes, and practices. This study has still scope for further research into the problems endured by the organisations, and service industries on the path of implementing and establishing the Green HRM. Also, the future researcher and scholars can focus on the empirical studies since there is only a handful of an empirical study carried out in particular area. A satisfied employee heartfully works to any extent for the progress of the organization. Maximum potential of the employee can be extracted by this approach. The earlier literature proved that Green HR practices will have optimistic effects on employees' loyalty, satisfaction, engagement and performance. The study necessitates the employees' satisfaction for their better performance.

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# Employer Branding Enhancing Employee Performance and Retention

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**Abstract:** *Employer branding is a well-known idea among young researchers and businesses. It is the process of looking for qualified employees. The goal of employer branding is to retain potential employees while attracting new, qualified ones. In order for an organisation to be sustainable and exist a long time, it is important that it effectively promotes its organisational goals with the aid of potential employees. Unquestionably, an important element of modern businesses is employer branding, which offers a fine combination of the science of marketing with the art of clever human relations management. The primary goal of the study is to conceptually evaluate the contribution of employer branding to improving employee performance and retention. An effective employer brand encourages strong employee engagement, which boosts productivity. The signalling theory is used in this paper to explain the idea of employer branding. Finally, we discuss a practical application called employment branding and offer ideas for further research.*

**KEY WORDS:** Employer branding, Employee performance, Retention.

**Introduction:** Employer branding is the result of integrating marketing with human resources management. Employer branding is integrated into a thorough understanding of how to attract and keep qualified workers. Sustainability in organisation is important in contemporary competitive environment. Employer branding is believed to be playing a vital role in providing suitable employment in comparison to competitors, in order to achieve competitiveness. Employer branding helps to match the right employee with the right job. Nowadays, businesses give a lot of consideration to the ways they attract and retain talent employees. Employer branding is a strategic tool that businesses can use to position itself as "employers of choice," that will also assist them both attract and retain talent employees. Promote attractive employer branding approaches in specifically. Since then, employer branding has developed to be a significant factor for worldwide firms in the research and development industry. Employer branding positively affects in enhancing employee performance and retention. The platform for attracting and retaining potential employees is employer branding. It encourages skilled employees who feel that it is a great place to work.

The desire to comprehend the experience of going to work is at the basis of employer branding. what motivates individuals to continue working for that organisation. If a business wants its employees to protect the company's reputation. Clearly, it must realize what motivates their level of participation Commitment. organization can better

understand the business by focussing on that are most likely to attract new hires to a company and enable them to adapt their recruiting strategies effectively.

***Signaling theory:***

The theory of signalling describes in great detail how candidates could be attracted to an organization that is searching for employees as well as how potential can be established by information or signals that are generated by a company's qualities during the recruiting process (Rynes, 1991). Various recruitment-related information seen by potential employees as elements of organizational and company aspects. to improve the employee performance and retention, apply employer branding to attract and retention.

**Literature review:**

Employees are attracted to the concept of employer brand in the literature by organizations becoming more attractive. It has been suggested that the primary goals of the employer brand should be to enhance the employee experience, retain current employees, and offer organisations a consistent framework for building employee Performance and Retention.

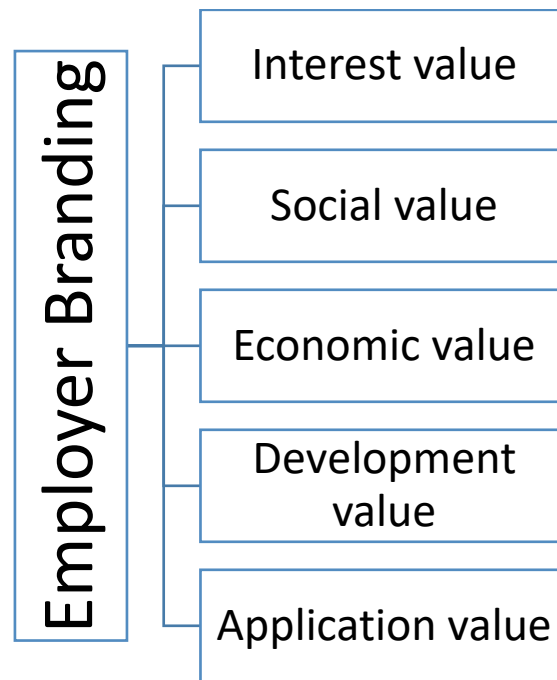
- Sutherland, Torricelli, & Karg stated in 2002 that it is extremely difficult to recruit and keep staff in a struggling business. Retaining talented workers is essential for growing into a successful business organisation. Employer branding is a strategy for establishing a business's identity and image. It also aids in communicating the organization's values and symbols to future employees.

According to Robert & Dowling, high-performing organisations have a better opportunity of improving retention performance over time if they also have broadly excellent reputations. It is consistent with the growing body of strategy research relating to enhanced performance.

- Employer identity is important for enhancing the employer brand image and keeping the business from breaking under, suggest Collins and Stevens in their 2002 study. Employment branding, according to Sullivan (2004), is a targeted, long-term approach to manage current and prospective employees' awareness of and views of a certain business. It works by continuously delivering a management and business process impression that makes your company a desirable, "good place to work."

- Pallavi Mehta and Khushboo Sharma (2014) researched Udaipur business institutions to learn how employer branding promotes employee retention and how it might help a suffering company.

To compete successfully in the struggle for talent, an employment brand needs to flourish in each of these categories. In order to emotionally connect with the organization's current employees and potential recruits, an ideal employment brand integrates the attributes of the workplace with the customer brand. Additionally, it distinguishes the organization from competition and verifies and connects with the culture and values of both current and prospective employees



**Figure:1 Employer branding five Dimensions**

Employer branding is divided into five strategies that are provided by organizations and create value for both current and prospective employees. Interest value, social value, development value, application value, and economic value are the five dimensions.

**Interest Value**

Employers provide interest value as a psychological benefit. It includes things like "high-quality and "creative work methods," and "difficult duties." It has been discovered that interest value is strongly connected with job identity, which may then result in employee commitment and retention.

**Social Value**

Social value is characterized as a specific psychological reward that organization offer employees. This type includes a polite workplace with cordial relationships between coworkers and a strong sense of teamwork. Since they have a beneficial impact on employee attitudes and their intention to stay, the fundamental factors of social value have been the topic of much discussion among researcher.

**Economic Value**

Economic value refers to the financial advantages that employees receive. Both monetary and intangible advantages are included. The factors "above average wage," "excellent job security," and "attractive compensation package" are all compromised. Economic benefits are the primary determinant of where an application should work. The current development consequently assumes that increasing economic value can enhance employee retention...

**Development Value**

he structural improvements that an organisation can provide are its development value. It consists of things like recognition, self-worth, security, prospects for job advancement, and a platform. The probability of development and promotion has been connected to talent retention, according to some arguments.

**Application Value**

A sort of functional value that an organization might offer employees is application value. It includes things like "compassionate workplace," "opportunity to apply what they have learnt," and "take corporate social responsibility employee -oriented workplace and

behaviours have a favourable impact on job satisfaction, employee commitment, and other factors connected to retaining employees.

### **Employee performance**

Performance in-Role and Employer branding is a key HRM strategy that organizations implement enhance their ability to participate in the employment. It describes benefits provided to ensure efficiency and effectiveness and promoted to prospective employees on a practical, psychological, and financial level. The emotional empowerment that underlies relationships between employers and their employees is expressed in employer brand. Employer brand, has both practical and symbolic advantages Symbolic advantages are made of emotional and intangible characteristics, whereas functional benefits are composed of objective and tangible qualities.

Performance management should be much more than a once-a-year performance review. Rather, it should be an everyday part of a high-performance organizational culture. In recent years there has been much rethinking about the role and function of performance management. One comprehensive review and re-examination of this important process concluded that effective performance management requires three regular and ongoing activities.

- Communicating expectations on a regular basis
- Providing feedback in real time whenever exceptional or poor performance is observed
- Helping employees develop expertise that maximizes their potential

Although the descriptions are slightly different, the same three elements are reflected clearly in the American National Standard on performance management (American National Standards Institute 2012). Those three elements are:

- Goal setting: the process of establishing objectives to be achieved over a period of time
- Performance review: the process of assessing progress towards goals, reputation.

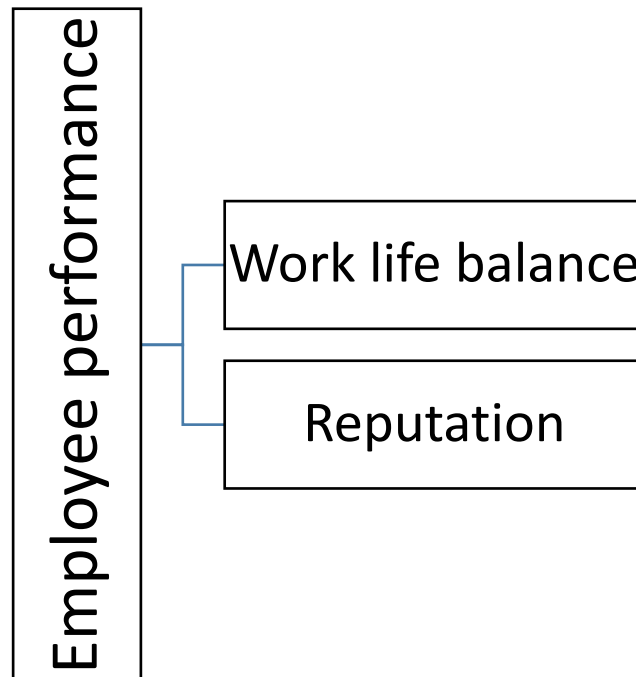
Employee performance is improved by employer branding. They experience greater productivity and job satisfaction. In terms of employee performance, we cover two dimensions.

### **Work–Life Balance related to Performance:**

Organisations have now started incorporating work–life balance strategies in their respective employer branding exercises. Literature suggests that work–life balance strategies can help an organisation enhance its employee’s performance, which will in turn, lead to increased employee satisfaction, it would be very difficult for an organisation to develop its employer brand without incorporating work–life balance as one of its components. work–life balance as an important component for establishing a strong employer brand.

### **Reputation related to employee performance:**

Reputation has always been viewed as a crucial asset for a company to gain a competitive advantage over its counterparts. The importance of this dimension lies in the fact that it helps a firm become an employer of choice reputation is considered to be one of the constituents of the employer branding process Implementing company performance into the employer brand will further help a business in achieving better performance.



**Figure 2 Shows Employee performance with two dimensions**

**Relationship of Variables**

**Work–Life Balance vs Performance:**

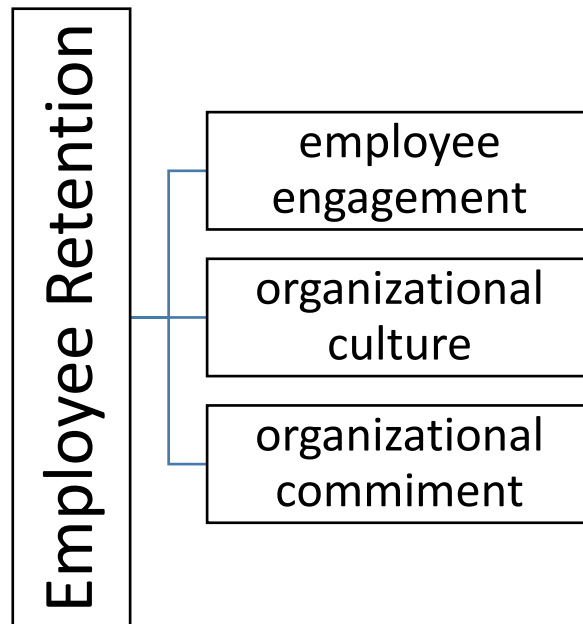
Work-life balance is favourably correlated with employee performance in this case. To enhance It is feasible to enhance employer branding while increasing employee satisfaction.

**Reputation vs employee performance:**

The literature mentioned above suggests that employee reputation significantly improves performance. Employees that feel highly regarded have exhibited good performance and will support the business for a long time.

**Employee Retention:**

Employee engagement, Organizational culture, Organizational commitment is considered in this research study as a behaviour with several origins that comprise the construct of employee retention, once employees are engaged with their work, they will have a consequence in the form of willful employees' retention. Gilmore (2017) developed the process of origins leading to behaviour and then to outcomes.



**Figure:3 Employee retention with three dimensions**

**Employees’ Engagement related to employee retention:**

Employee engagement is viewed as a result of various positive aspects, such as high-performing organizations, supportive work colleagues, job satisfaction, career growth opportunities, socially proactive workplace, more conducive environment, and so on. Essential formation encourages awareness of the fact that the origins of employee engagement mentioned above are primarily significant predictors and factors of employer branding, one of the major factors of employee engagement is corporate branding. These indications can also be used to predict talent retention at will, although the link between said indicators and talent retention will be inverse, as it is with turnover intentions once employees is engaged with their work, they will have a consequence in the form of unwilling employees’ retention.

**Organizational culture related to employee retention:**

Employer branding boosts the organisational culture within a business, and businesses with strong organisational cultures benefit from higher levels of retention. To ensure that dimensions of culture are maintained, an organization's culture needs to be effectively communicated. To do this, the organization's brand values must be highlighted. Observed that businesses with organisational cultures that have clear values can use those principles to inspire people to take specific action. The organisation will then benefit from higher retention levels due to individuals feeling empowered while working for that particular company, and thus increasing job satisfaction Furthermore, Backhaus and Tikoo (2004) proposed an ‘Employer Branding Framework’ which suggests that when employees’ beliefs, attitudes and values match and are aligned with the company’s core values, employee retention is greater, as they identify with the organisation and its culture.

**Organizational commitment related to retention:**

Commitment is thought to be higher in an organisation where the employees identify and are involved with the brand and also in organisations where employees exhibit a significant psychological attachment to the Retention. It observed that certain psychological needs are recognised between the employee and employer to enable an organisation to be perceived positively by a new employee, and to develop commitment from them. A psychological contract should be established during the recruitment process.



organisations should form part of a psychological contract that correlates with the employer brand in return for commitment throughout Retention.

**Relationship of Variables**

**Employees’ Engagement vs employee retention:**

Employee retention and engagement are positively correlated. employer branding to hence It minimizes the negative impacts of absenteeism. it increases the intention of employee turnover.

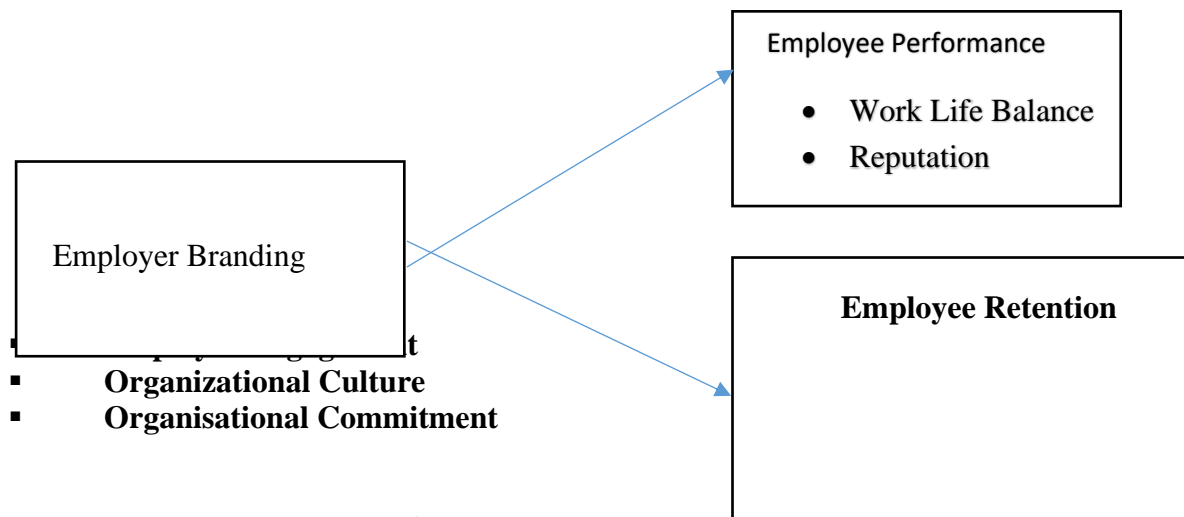
**Organizational culture vs employee retention:**

The retention rate of employees is increased by organisational culture. Employee participation in the organisation improve employee empowerment.

**Organizational commitment vs employee retention:**

Employee retention and organisational commitment are positively correlated. Since it indicates a psychological contract

**Conceptual Framework**



**Figure4: Indicate conceptual framework related to Employer Branding**

Prospective employees are willing and ready to look for information outside of what the employer brand provides goal of developing an employer brand is to create a favourable impression of the business that promotes employee involvement in terms of enhance employer performance and retention. Employer brand is now seen from a more institutional and comprehensive perspective, as: "An ongoing progressive institution that comprises various different kinds of desirable experiences and outcomes that are communicated to both current and potential employees, by which the employing company clearly distinguishes itself from competitors, and at the same time, they give the organisation the authenticity to compete in the employment market over the highly qualified expertise. Organizational commitment, employee engagement, and culture all help in retention. Employer brand represents a profitable long-term investment, with significant impacts on organizational performance and Retention. This is because it enables organizations to recruit and maintain highly qualified talents who contribute significantly to their organizational results. Moreover, employer brand has major influences on employees’ attitudes. Employer brand and employee in-role performance. Recognition, assessment, and team development are all ongoing elements of performance management, which also work together as a team that performance with the strategic goals of the organization Performance management's aim is to provide both orientation and direction, much like a compass. It displays both one's current direction and planned

direction (Cascio 1996). Like a compass, the job of the manager is to identify where a person is now, as well as to focus effort and attention on the desired direction. Directly in opposition, employee engagement has been found to be a predictor of a number of outcomes, including perceived performance, employee retention, and employee turnover intention. The construct of employees' involvement has therefore been shown to be both a cause and a consequence of several constructions. As a result of various constructs that emerged during the literature review, such as recognition of employees' work, communication with colleagues, colleague behaviour, job conditions, nature of the work, supervision, pay structure, promotion-related policies and practices, individual attributes of employees, work-life balance, and economic situation, and so forth.

### **Discussion:**

The study concentrated on filling up gaps in literature survey. The study has a positive impact on employer branding and employee performance. Once employees are satisfied in their work culture, they have a high motivation towards work and better performance. In the study proves that employer branding and employee retention have a significant relationship. Its is a very necessary for organization to retain their employees and improve their involvement, efficiency. The way that human resources are valued and handled in the modern world has changed in a significant way. Employer branding has become a strategic tool for attracting and keeping talent. Baby boomers and current members of the generation have different preferences for organisational features. We found compensation, career opportunities and growth, and job satisfaction as prevalent organisational feature pro file, brand name, corporate culture, employee empowerment, training and development, encouraging and supportive co-workers, innovative employers with novel work practises, humanistic organisations that give back to society, job security, recognition and appreciation, having a good relationship with supervisor, the organisation is customer oriented, and acceptance and belonging. After that, seven organisational characteristics were determined on throughout focus group discussion was shown that the preferred organisational features vary depending on the educational program. Communication of the employer brand to potential employees is one of the key elements in the employer branding process, making channel selection a strategic task. According to the study, potential employees prefer to learn about employer brands through job portals, while 33 percent of respondents claimed to have learned about them through corporate visits or presentations. Time and resources would be wasted if employer value propositions are not presented to the appropriate audience in the proper manner.

### **Recommendations:**

Future research on the subject will examine the relationship between the attractiveness of employer brand and the attractiveness of an employee. The potentially connected with companies competing for talent to ensure organisational sustainability and economic growth. Employer branding improving employee retention and performance. Enhance business reputation and employee value proposition while adopting employer branding. Positive improvements will be seen in employee characteristics like job satisfaction, communication, motivation, and employee empowerment. The results of this study have indicated potential areas for further study. A combination of quantitative and qualitative methods will be beneficial for future study. Further study on the precise underlying causes of the small social value and development value's effects on talent Retention needs to be studied upon. Employing the available communication means, such as a company's website, advertising, social media, and other networking platforms, effectively helps in promoting the goodwill associated with an employer's brand. However, in order to remain competitive, organisations should maintain to be alert, adaptable, and willing to change.

Understanding of an employer's actual brand message is deepened by actively seeking out and acting upon feedback from both current employees and departing employees (using exit interviews and comments on job sites, for example), as well as feedback from digital or physical comment boxes, surveys, social media, and anonymous job sites. The same tools enable organisations to track and evaluate the performance of their employer branding activities and determine any areas that might also require adjustment. Positive outcomes.

### **Conclusion:**

This paper investigates the structure of the employer branding. The employer brand is created in order to form positive impressions about an employer, to create an image of company as the “best place to work”, to provide better performance, retention, loyalty and engagement of employees. This research can be a starting point for many other areas of research on the subject area and gives a relatively clear understanding on the importance of employer brand management influencing employee brand commitment, leading to performance. To identify and validate the aspects of employment branding as a component of corporate branding, more research is required. A fundamental component of successful organisations is a strong employer brand, which makes a significant contribution to brand reputation and assists organisations in attracting and retaining top personnel to achieve a competitive edge. Ambassadors for the employer brand are employees. A brand disaster can be avoided by maintaining constant awareness of and focus on one's employer brand. The benefit is that maintaining one's employer brand's reputation is far simpler to prevent than to restore. Senior leaders must devote time, energy, and money into enhancing their employer brand image and making sure that it is in line with their organization's identity, values, culture, and strategy in order to maintain a positive brand reputation. A good employer brand requires ongoing maintenance. It is a process that calls for ongoing care, focus, and participation from all team members, including leaders, present workers, and even prospective employees. Fostering honesty and genuineness in the employer brand's statement sets it apart from that of competitors. This positive message is further promoted by training employees to understand and live the employer-brand message and by involving employees in functioning as brand ambassadors for the business.

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# Innovative Technology Models Influencing the Customers' Usage of Digital Banking Services – A Study Conducted in Karnataka

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## **Abstract:**

*Modern bankers are providing several other services along with the basic services of banking. The virtual platform in the current era has created several opportunities for providing different banking services. The present study was conducted to understand the different models of diffusion and technology acceptance proposed by several writers and thinkers and to assess customer usage of digital banking by using the parametric elements of age, gender, occupation, education, and working hours. The primary data is collected through the questionnaire. Knowledge, perception, perceived usefulness and ease of use, and expectations are the identified elements in the process and models. The current study revealed the influence of the social system on the usage of innovative banking services. The study also proved that one of the service features, i.e., ease of use, plays a drastic role in its acceptance and adoption. The working situations and convenience matter, along with the customer usage behaviour. The elements involved in the decision and adoption process of the new technology that have been identified in the study are personal factors, product factors, and social factors, along with the elements stated in the models.*

**Keywords:** Diffusion, Digital Banking, Net Banking, Mobile Banking, UPI Payments.

## **1. Introduction:**

In India, modern banking is identified with the establishment of the Bank of Hindustan in the year 1770 (Ishan, 2018). Deposits of money received from the general public that are repayable on demand and withdrawable by check, draft, or order (Dixit, 2019). The definition focused on the basic functions of banks.

Modern bankers are providing several other services along with the basic services of banking, namely, collection of cheques and drafts, acting as paying agents, commission agents, payment for utilities, mercantile services, acting as a factor for debt collection, providing safe locker facilities and other supportive services as per the needs of the customer. During the 1980s, banks pioneered digital banking services with these offerings. In the present day, with the enhanced technology development and the collaboration of fintech companies, banks are providing digital banking services in three ways, i.e., Net banking services through banking websites, Mobile Banking Services through banking apps and UPI services.

Figure 1: Forms of Digital Banking Services.

Internet Banking	Mobile Banking	UPI
Internet banking is the process by which a user connects to banking services via a virtual platform by using the internet, a browser, and the bank's website. On the digital platform, the borderless entity offers banking options at any location and at any time (Vyas, 2012). The user can access internet banking by registering through the official website by using their account number, mobile number, and other information. The service allows the user to check the balance, account transfer, online bill payment, card control services, online account statement, repayment options, and other self-services.	Mobile Banking is another way of going digital for availing banking services where banking applications are installed on the mobile phone and banking services are done through these applications. Mobile banking has 17 dimensions, of which five are identified as game changers with respect to satisfaction and dissatisfaction (Minjoon Jun, 2016). The user found convenience, diversity, and ease of use while using mobile banking services. The services available in mobile banking are narrow compared to net banking.	UPI is identified as a revolutionary technique in the payment system introduced by the National Payment Corporation of India (NPCI). With the recognition by the social platform, the UPI payment system unfolds the market percentage after demonetization. UPI payment applications expanded their payment service area (Sunny Gupta, 2020). UPI was designed specifically to promote cashless payments for small transactions. It restricts the value of transactions and is managed by an automated system.

## 2. Literature Review:

Jean Robert Kala Kamdjoug, et al. (2021), in their study of "determining factors and impacts of the intention to adopt mobile banking apps", they built a research model relying on the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT2) and other models. The study revealed that the user's perception and behaviour play a significant role in adopting the mobile banking applications (Jean Robert Kala Kamdjoug, 2021).

Fahad (2022) evaluated UPI influencing factors using the Diffusion of Innovation theory in his study "Exploring the Determinants on Adoption of Unified Payment Interface (UPI) in India: A Study Based on Diffusion of Innovation Theory." The study identifies diffusion of innovation elements that have a high impact on user intention. The study revealed that the relative advantage has a positive impact on the intention to use it. As per the study, UPI is in the diffusion stage because of non-availability on each platform. Complexity, relative advantage, and observability are the key features of the UPI (Fahad, 2022).

Varsha Rammaiya, et al. (2019), have made a "KAP Study of E-Banking in Indore". In this study, the researcher stated the features of E-Banking, namely, 24\*7 service, easy access, and time-saving. The study aims to know the problems of online banking, analyse the trend, and determine the customer's perception. The study used the Likert scale method for the questionnaire and the graphical method of representation of results. It has been identified that the main services used in e-banking are fund transfers, ticket booking, and shopping. The study concluded by suggesting the need to convince the customer to adopt E-Banking (Prakash, 2019).

Sahin (2006), has made a detailed "Review of Roger's Diffusion of Innovation Theory and Educational Technology Related Studies based on Roger's Theory". As per the researcher, the adoption of an innovation has been studied for 30 years. The researcher expressed Roger's word for adoption as "full use of innovation as the best course of action." The study explained four elements of diffusion, Innovation Decision Process, Adoption Rate, and adopter categories. The innovation decision process explains the

factors influencing the buying behaviour and intention to adopt an innovation. Adopter categories disclose the types of users in the initial stage and later stages (Sahin, 2006).

Viswanath Venkatesh, et al. (2003), studied and compared eight different prominent models, through which they formulated and validated a new unified model, namely the Unified Theory of Acceptance and Use of Technology (UTAUT). The study is disclosed in the paper "User Acceptance of Information Technology: Toward a Unified View." Individuals' age, gender, experience, and voluntariness of use influence their behavioural intention through performance expectancy, effort expectancy, and social influence. The facilitating conditions and the behavioural intention led to use behaviour (Vishwanath Venkatesh, 2003).

### **3. Objectives:**

- a. To study the different models in relation to diffusion of technology from the point of view of innovation, availability of technology, reliability, and usage of technology by the customers of different banks.
- b. To analyse the different factors that enhance the digital banking services in Karnataka.
- c. To conclude and suggest possible influencing factors towards the increase in the usage of digital banking services in Karnataka.

### **4. Hypothesis:**

H<sub>0</sub>1: There is no significant relationship between gender and overall satisfaction of Digital Banking Usage.

H<sub>0</sub>2: There is no significant relationship between age and overall satisfaction of Digital Banking Usage.

H<sub>0</sub>3: There is no significant relationship between occupation and overall satisfaction of Digital Banking Usage.

### **5. Innovation in Technology:**

Any new technology that comes into the world for the betterment of services is acceptable by the different categories of users of technology. Now, several writers and eminent scholars have suggested and provided various models which provide insights as to how technology becomes acceptable among different groups of people. In the following paragraphs, efforts have been made to identify various factors which influence the mindset of people who adopt technology in their day-to-day lives. The factors as suggested by different models can also be adopted by the banking industry to enhance the spread of banking services in a particular locality.

#### **a. Diffusion of Innovation:**

Everett M. Roger has developed a theory to explain how an innovation occupies its space in the social system. Any new idea, product or service is an innovation. Knowledge of innovation passes to potential adopters through communication channels. With a certain time, the innovation is either diffused or rejected in the social system. (Sahin, 2006).

#### **i. The Innovation Decision Process:**

The innovation decision process has five stages. Knowledge is the first thing to decide. At this stage, individuals get informed about the product or services through mass media,

word of mouth, or self-interest. It is the basic awareness of the availability of the product. The second process is people's perception of the innovation. The perception is influenced by its relative advantages, compatibility, complexity, triability, and observability. If the innovation has supportive benefits that fulfil the existing needs of the customer in the most preferable manner, then it will get good acceptance. Perception will differ from individual to individual and time to time. The perceived behaviour steps towards the decision. Roger described it as an adoption or rejection. Whether the adoption is continuous or not, will depend on the benefit gathered from the adoption. Continuous adoption is the implementation. At this stage, the innovation is put into regular practice. It replaces the earlier practises or introduces the new practises as a result. After checking compatibility and observability, Confirmation is the stage of actual adoption, confirms the acceptance and adoption of innovation. The user remains committed to the innovation in this case, unaffected by external forces. (Sahin, 2006).

ii. Adoption Process:

Roger has classified potential adopters as innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%) (Sahin, 2006).

Innovators are open-minded with high confidence and specific in most cases. Innovators make products flow into the social system. Early adopters are quick in analysing the pros and cons of innovation and play an important role as opinion leaders and influence all categories of adopters. In the early majority, identified as wanting long-term satisfying power, normally not interested in the product. When more than half of the society has adopted the innovation, the late majority will accept it. They are price-sensitive. Laggards are last in the queue for the adoption process.

As per Roger's Innovation Diffusion Theory, knowledge and persuasion are the most affective factors which influence adoption. Individuals' perceptions at the beginning of the use of a product or service may differ after trial usage and keen observation. If the service feature has the capacity to influence the individual's perception continuously, then that innovation gets diffused quickly.

b. Technology Acceptance Model (TAM):

Fred D. Devis has developed a model for the acceptance of technology with two factors, namely, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Ease of Use influences Perceived Usefulness and both influences intention to use, which results in the usage behaviour of an individual. (Ishan, 2018).

c. Unified Theory of Acceptance and Use of Technology (UTAUT):

This theory was developed by Venkatesh et al. to give one solution for usage behaviour. The UTAUT explains the reasons and intentions for the use of information in the system and the reasons for continuing the subsequent usage behaviour. The model explains four elements, namely, Performance expectancy, Effort expectancy, social influence, and enabling conditions will influence behavioural intention and use of behaviour. The gender, age, experience, and voluntaring of use will influence the expectancy elements (Vishwanath Venkatesh, 2003).

## 6. Research Methodology:

For the current study, 100 customers were selected by the convenient sampling method and received 92 responses. The study has been conducted in urban and semi-urban areas of Karnataka, India. The selected customers were given a questionnaire containing a set

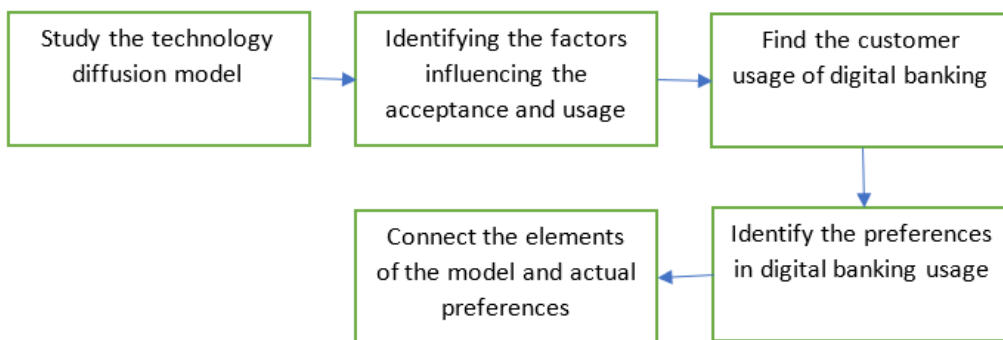


of questions pertaining to usage of digital banking services, which formed the basis to determine the various factors responsible for the diffusion and usage of digital banking services in Karnataka.

In order to understand the theoretical inputs of various models in the support of the availability of innovative digital services in banks, several research papers, journals, articles, etc., available through websites, libraries, etc., were referred to. Descriptive and inference statistics, frequency analysis, percentage analysis, and Chi-Square were used for the study.

a. Procedure and sample:

Figure2: Process and Structure of the paper.



The present study was conducted to understand the different models of diffusion and technology acceptance by several writers and thinkers. The study identified the ease of use, perceived usefulness, and social factors as the common elements described as factors. The study wants to identify the customer usage and acceptance of digital banking through a questionnaire. The convenient sampling method is used to collect the data by taking age, gender, education, occupation, and working hours as parameters.

Table 1: Demographic Profile of the Respondents.

Demographic Profile of the respondents			
Measure	Items	Frequency	Percentage
Gender	Male	58	63.0
	Female	34	37.0
Age	18-25	21	22.8
	26-40	39	42.4
	41-50	17	18.5
	51 above	15	16.3
Education	Graduate	45	48.9
	Post Graduate	23	25.0
	Ph.D.	09	9.8
	Others	15	16.3
Occupation	Private Employee	36	39.1

	Government Employee	20	21.7
	Self-Employee	16	17.4
	Others	20	21.7
Working Hours	<8 hrs	31	33.7
	9 to 12 hrs	33	35.9
	>12 hrs	20	21.7
	Others	8	8.7

The above table shows the demographic responses of the respondents. The data set includes 92 observations received from the urban areas of Karnataka. The twenty questions were used to collect information.

7. Analysis and Interpretation:

a. Table 2: Source of Knowledge Gained.

Source of Knowledge								
	Mass Communication		Word of Mouth		Learnt from Own		Demo Process	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
HA	14	15.22	35	38.04	21	22.83	24	26.09
A	53	57.61	35	38.04	37	40.22	24	26.09
N	15	16.30	10	10.87	17	18.48	14	15.22
NA	9	9.78	8	8.70	11	11.96	17	18.48
HNA	0	-	3	3.26	5	5.43	12	13.04
NR	1	1.09	1	1.09	1	1.09	1	1.09
Total	92	100.00	92	100.00	92	100.00	92	100.00

(HA-Highly Accepted, A-Accepted, N-Neutral, NA-Not Accepted, HNA-Highly Not Accepted, NR-Not Responded)

From the above figure, it has been observed that a highly accepted source of knowledge is word of mouth, as 38 percent of the respondents highly accepted that they had got information about digital banking only through word-of-mouth. The result shows 57.6% of the respondents accepted that mass communication is the source of knowledge as they have gained knowledge through mass communication. 10% to 18% of the respondents were neutral regarding the expression of the source of knowledge. Nearly 1% of the respondents did not respond to the request to disclose the source of knowledge.

b. *Table 3: Usage of Digital Banking Services through Net Banking, Mobile Banking and UPI*

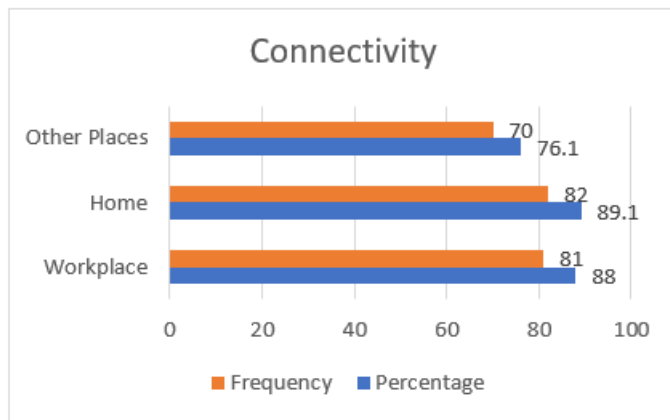
Service Usage	Net Banking		Mobile Banking		UPI	
	Frequency	%	Frequency	%	Frequency	%
Fund Transfer	62	67.4	83	90.2	79	85.9
Utility Payment	57	60.9	71	77.2	71	77.2

The above table shows that Mobile Banking services are highly preferred for fund transfers. In 90% of the cases, customers prefer Mobile Banking for fund transfers, and in 86% of the cases, they prefer UPI mode for fund transfers. The UPI preference for shopping purposes is 88%, which is high compared to Net Banking and Mobile Banking. The preference for Net Banking is less when compared to Mobile Banking and UPI. 59.8% of UPI users use the service on a regular basis.

c. *Ease of use:*

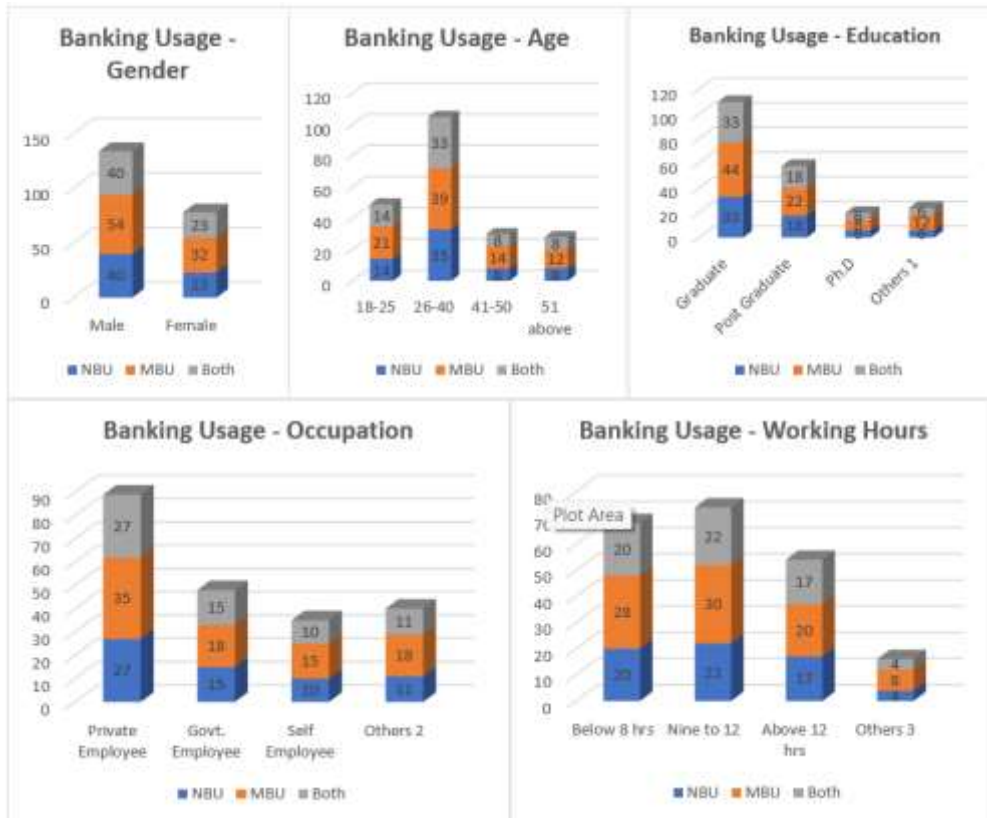
It is observed that 90% of the respondents have accepted that, digital banking system is easy to use and 95.5% of the respondents have accepted that it saves time. The respondents saw convenience in the process of using the service and time savings.

d. *Chart 1: Connectivity in workplace, home, and other places.*



As per the above chart, 88% of the respondents have proper network connectivity at their workplace. 89.1% of the respondents have connectivity at home, where several have adopted personal connectivity options in their homes and got connected by themselves. 76% of the respondents have connectivity in other places also. This is one of the reasons for using digital banking services.

e. *Chart 2: Digital Banking Usage by different demographic characters.*



It is observed in the above figure that male respondents are more than female respondents for digital banking usage. It is again observed that users of Net Banking are also users of Mobile Banking. It indicates that the use of Net Banking makes the use of Mobile Banking easier as all the users of Net Banking are also the users of Mobile Banking. The percentage of Mobile Banking users is 100% in the age groups of 18 to 25 and 26 to 40. The younger generations have fully adopted technology. Graduates have a higher percentage of users than others. The percentage of private employees is higher in comparison with others. The mobile banking usage of respondents who have more than 12 hours of working hours is 100%. Convenience and situational factors matter here for the adoption of the digital mode.

f. Test of Independence:

The researcher used the Chi-Square test to check the relationship of overall satisfaction with digital banking usage with gender, age, and occupation. The 'P' value of the relationship between gender and overall satisfaction of digital banking usage is 0.603. The 'P' value of the relationship between age and overall satisfaction of digital banking usage is 0.055. Therefore, the null hypothesis is accepted for both genders and age. The 'P' value of the relationship between occupation and overall satisfaction with digital banking usage is 0.017. Here, an alternate hypothesis is accepted.

8. Findings:

- a. The social system and social structure have influenced the usage of digital banking services. The word-of-mouth source of knowledge is based on social background.
- b. Perceived knowledge and usefulness increase the use of Digital Banking. UPI has the wider acceptance with perceived usefulness.
- c. Ease of use is the most influential factor in the diffusion of digital banking.
- d. The percentage acceptance of different modes of digital banking services can be traced in the adoption process to the late majority stage.

- e. There is a significant relationship between overall satisfaction level and occupation.
- f. 72.83% of the respondents said they use computer in their workplace.
- g. 66% of the respondents are using the banking services during the working hours i.e., at work.
- h. 95.65% of the respondents have accepted that they have knowledge of digital banking services.
- i. 68.48% of the respondents were using the net banking services and 93.48% of the respondents were using the mobile banking services.
- j. The word of mouth has been accepted as the most influential means of communication; mass communication is next to that. 22 to 40% of the respondents were learned by themselves, and 26% of the respondents were influenced by the bank's demo process.

## **9. Conclusion:**

The use of a computer provides fundamental knowledge of digital instruments. Knowledge of digital banking does not mean the use and adoption of digital banking services. Personal factors such as intent to use, customer expectations, service factors such as ease of use and availability, and social factors such as word of mouth all influence innovation adoption. In the rural areas, the rural co-operatives are providing every basic financial service on foot. The services, from payment of utility bills to a huge amount of funds transfer, have been served as primary services in one place. It is one of the reasons that there has not been any necessity to take digital services. Connectivity is a necessary element in adoption. Good connectivity increases the availability of services and users.

The study concludes with the need to increase digital banking usage in the rural areas of Karnataka. The study shows that there is a significant relationship between occupation and overall satisfaction with digital banking usage.

## **10. Limitations of the Study:**

- a. The study has been conducted only in selected urban and semi-urban areas in Karnataka.
- b. The study can be further expanded in respect to areas.

## **11. Recommendations:**

- a. The study helps to identify the social factors influencing the adoption process.
- b. The complexity element should be reduced for further spread in society.
- c. Strong network connectivity is expected to improve, as most people are currently building network connectivity by investing in their own assets. Strong network connectivity is essential for reaching digital only banking.
- d. The digital payment and receipt system must begin at the beginning.
- e. The payment belongs to the local authority with respect to house rent, water bill, etc., should also come under UPI or mobile banking.

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# Sentiment Analysis of Multilingual Twitter Data using Natural Language Processing

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## **Abstract:**

*The feelings of **netizens** have a great influence on rest of the users, product sellers and market analysis. It is necessary to well structure the unstructured data from various social platforms for proper and meaningful analyses. For the classification of multilingual data, the analysis of feelings has recognized significant attention. This is called textual organization that may be used to classify state of mind or feelings expressed in different ways like: negative, positive, neutral, thumbs up, thumbs down, etc. in the field of Natural Language Processing (NLP). To solve this kind of problem, sentiment analysis and deep learning techniques are two merging techniques. Because of machine learning ability, deep learning models are effectively used for this purpose. Recurrent Neural Networks (RNN) and Naive Bayes algorithm are two popular deep learning architectures to analyze feelings in sentences. These architectures may be used in natural language processing. In this research article, we propose solutions to multilingual sentiment analysis problem by implementing algorithms and in order to contract the result, we compare precision factor to find the best solution for multilingual sentimental analysis.*

## Dealing and Tracking of Security Surveillance System in Real Time Video in Cloud

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**Abstract** - *In this paper we proposed the number of surveillance cameras installed in public places has substantially expanded recently, and an alarming amount of visual data is being created at this time. As a result, a distributed system for video analytics is in demand. The uses distributed streams and cloud file management systems to capture video streams and handle real-time data from device-independent data sources. Video surveillance and tracking have drawn a successfully increased interest in recent years. Real-time footage being accessible for business owners as needed is one of the key advantages of video surveillance for businesses. Such commercial video surveillance techniques often required you to pay a second person to be on-site and monitor all real-time footage. But thanks to modern technology, such monitoring may now be done with ease from a distant computer, a mobile device, or a tablet. While making sure all the cameras are capturing the output, it is also possible to see the live video from several cameras in a single window. The methods that can use by taking a live video feed frame by frame and analyze each frame for the presence of moving objects. Subtract the input frame's estimated background information. If the item is a thief, the system buzzes the alert immediately; otherwise, it waits until another frame needs to arrive. The future strategy calls for accelerating the analysis of identified objects and the processing pace. Future studies will aim on incorporating other video elements including borders, color, and texture. Additionally, we will work to develop a reliable tracking system with a classifier to categorize the attributes and conditions of the objects.*

**Key Words** – Security Surveillance, Real Time, Dealing, Tracking, Video Analytics.



# The Study of Quiet Quitting Phase and the Strategies used to fade out the Phase by the Human Resource Department

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## **Abstract**

*Quiet quitting is about quitting the idea of going above and beyond your key responsibility area at work. Over the years quit quitting has been a sleeper cell in the Indian society but with the trigger of the pandemic, which has allowed this concept to wake up and add fumes to the quiet quitting phase. This present study is trying to investigate the different reasons for the evolution of quiet quitting phase, the signs of the quiet quitting and the steps taken by the human resource department to eradicate the quiet quitting phase. The study has used review of literature as the research method to explore the different dimension of quiet quitting. The outcome of the present research study will be helpful to understand the various strategies taken by the HR department to curb quiet quitting phase. Ultimately the proposed strategies will increase higher level of trust and work engagement between organization and its employee in the future.*

**Keywords:** Quiet quitting phase; Employees; Organization; Human resource strategies

# Cyberbullying Detection using Machine Learning

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## **Abstract:**

*Due to the significant negative effects that cyberbullying has on both individual victims and entire society, its detection has recently attracted more and more attention. Additionally, the ease of access to social media sites like Facebook, Instagram, Twitter, etc. has contributed to a sharp rise in the abuse of people through the use of poisonous comments, aggressive content, sexism, racism, hate messages, and bullying. We conducted this research to automate the identification process of offensive language or cyberbullying since there is a significant need to identify, control, and limit the bullying materials transmitted through social media platforms. Our primary goal is to develop an ensemble model that will divide the contents into two categories: "Bully" and "non-bully." For this, we selected four ensemble models, four machine learning classifiers, and two different feature extraction methods along with multiple n-gram analyses on a dataset taken from Twitter. In our work, the proposed Stacking classifier model outperformed the voting classifiers, Support Vector and Random Forest ensemble model classifier's individual performance in detecting cyberbullying. When TF-IDF feature extraction is used in with K-Fold cross-validation, Extra Tree and Random Forest models produce the greatest performance of 84%.*

**Keywords:** Cyberbullying, Text Classification, Machine Learning Classifier, Twitter.

## **1. Introduction**

A new form of bullying has emerged as a result of social media's growing userbase. The latter word is defined as purposeful or aggressive activities that are committed over time against a victim who is unable to protect themselves by an individual or group of individuals via repeated communication messages [1]. Bullying is nothing new to society. With the advent of the internet, it was only a matter of time until bullies discovered this brand-new, lucrative medium. Bullies developed the ability to carry out their heinous crimes in anonymity and with significant distance between them and their targets thanks to technologies like email and instant messaging. Cyberbullying, as described by Cambridge Dictionary, is the act of using the internet to hurt or intimidate another person, especially through sending those hurtful communications. The impact that cyberbullying has on the victim is what most distinguishes it from regular bullying. In contrast to cyberbullying, which is exclusively emotional and psychological, traditional bullying may result in both physical and emotional/psychological harm. Finding appropriate measures to identify and subsequently prevent cyberbullying is critically required given the negative effects it has on victims. Machine learning is one of the effective methods for learning from data and creating a model that automatically categorises appropriate actions. This paper's primary contribution is to suggest a supervised machine learning strategy for identifying and stopping cyberbullying. On a cyberbullying dataset from Kaggle that was

gathered and labelled, the suggested method is assessed. On the basis of both TFIDF and sentiment analysis feature extraction approaches, the effectiveness of Random Forest and Gradient Boosting classifiers is examined. Additionally, studies using several n-gram language models were conducted. When assessing the model created by the classifiers, consideration was given to the 2-gram, 3-gram, and 4-gram sizes. Finally, we compare our suggested strategy to earlier relevant work that made use of the same data to evaluate it.

## 2. Related work

There are many approaches that propose systems which can detect cyberbullying automatically with high accuracy. First one is author Nandhini et al. [3] have proposed a model that uses Naïve Bayes machine learning approach and by their work they achieved 91% accuracy and got their dataset from MySpace.com, and then they proposed another model [4] Naïve Bayes classifier and genetic operations (FuzGen) and they achieved 87% accuracy. Another approach by Romsaiyud et al. [5] they enhanced the Naïve Bayes classifier for extracting the words and examining loaded pattern clustering and by this approach they achieved 95.79% accuracy on datasets from Slashdot, Kongregate, and MySpace. However, they have a problem that the cluster processes doesn't work in parallel. Moreover, in the approach proposed by Bunchanan et al. [6] they used War of Tanks game chat to get their dataset and manually classified them and then compared them to simple Naïve classification that uses sentiment analysis as a feature, their results were poor when compared to the manually classified results. Furthermore, Isa et al. [7] proposed an approach after getting their dataset from kaggle they used two classifier Naïve Bayes and SVM. The Naïve Bayes classifier yielded average accuracy of 92.81% while SVM with poly kernel yielded accuracy of 97.11%, but they did not mention their training or testing size of the dataset, so the results may not be credible. Another Approach by Dinakar et al. [8] that aimed to detect explicit bullying language pertaining to

(1) Sexuality, Race & Culture and (3) intelligence, they acquired their dataset from YouTube comment section. After applying SVM and Naïve Bayes classifiers, SVM yielded accuracy of 66% and Naïve Bayes 63%. Moving on to Di Capua et al. [9], they proposed a new way for cyberbullying detection by adopting an unsupervised approach, they used the classifiers inconsistently over their dataset, applying SVM on FormSpring and achieving 67% on recall, applying GHSOM on YouTube and achieving 60% precision, 69% accuracy and 94% recall, applying Naïve Bayes on Twitter and achieving 67% accuracy. Additionally,

Haidar et al. [10] proposed a model to detect cyberbullying but using Arabic language they used Naïve Bayes and achieved 90.85% precision and SVM achieved 94.1% as precision but they have high rate of false positive also they work on Arabic language. Zhao et al. [13] proposed framework specific for cyberbullying detection, they used word embedding that makes a list of pre-defined insulting words and assign weights to obtain bullying features, they used SVM as their main classifier and got recall of 79.4%. Then another approach was proposed by Parime et al. [14] they got their dataset from MySpace and manually marked them and they used the SVM Classifier for the classification. Moreover, Chen et al. [15] proposed a new feature extraction method

called Lexical Syntactic Feature and SVM as their classifier and they achieved 77.9% precision and 77.8% recall. Furthermore, Ting et al. [16] proposed a technique based on SNM, they collected their data from social media and then used SNA measurements and sentiments as features. Seven experiments were made and they achieved around 97% precision and 71% as recall. Furthermore, Harsh Dani et al. [17] introduced a new framework called SICD, they used KNN for classification. Finally, they achieved 0.6105 F1 score and 0.7539 AUC score. SVM classifier was one of the approaches used in the re- search papers. Dadvar et al. [18][19][20][21] have constructed in the first and second paper a Support Vector Machine classifier using WEKA, their dataset was collected from Myspace. They achieved 43% on precision, 16% in recall and they didn't mention the accuracy, the only difference between the two papers is that they used gender information in classification in the second paper. Moreover, in their second paper 4626 comments from 3858 distinct users were collected. The comments were manually labelled as bullying(9.7%) and non-bullying (inter- annotator agreement 93%). SVM classifier was applied by them and were able to reach results of up to 78% on precision and 55% on recall. Finally, in their third paper they applied 3 models for their dataset gathered from YouTube comment section: Multi-Criteria Evaluation Systems (MCES), machine learning: (Naïve Bayes classifier, decision tree, SVM), Hybrid approach. The MCES score 72% on accuracy, while Naïve Bayes scored the highest out of the three with 66%. Moving on to another author, Potha et al. [22] have also used the SVM approach and achieved 49.8% result on accuracy. While Chavan et al. [23] used two classifiers: logistic regression and support vector machine. The logistic regression achieved 73.76 accuracy and 60% recall and 64.4% Precision. While for the support vector machine they achieved 77.65% accuracy and 58% recall and 70% precision's and they got their dataset from Kaggle.

### 3. PROPOSED METHODOLOGY

Several well-known machine learning (ML) algorithms and ensemble techniques have been used in this research to validate our proposed model using a publicly available dataset.

#### A. Dataset Description:

Cyberbullying, which is also known as cyber harassment, has become increasingly common, especially among teenagers as the digital sphere has expanded and technology has advanced. There are various datasets available that contain hateful texts and offensive languages used by different ages of people on various social media websites. As we are concentrating on detecting cyberbullying from tweets, we have used an already created benchmark dataset, from which we have randomly taken tweets. These data are stored as a CSV and each data file contains 2 columns- 'tweet' and 'text Label'. Tweet indicates the collection of all the tweets, both offensive and non-offensive, gathered for our experiment. And Class represents the labeling of each tweet. Non-offensive tweets are marked with a "0," while offensive tweets are marked with a "1." 2169 tweets are classified as offensive while 5489 are classified as non- offensive.

#### B. Data Preprocessing:

Pre-processing, features extraction and classification- tion step. In the pre-

processing step we clean the data by removing the noise and unnecessary text. The pre-processing step is done in the following:

- Tokenization:

In this part we take the text as sentences or whole paragraphs and then output the entered text as separated words in a list.

- Lowering text:

This takes the list of words that got out of the tokenization and then lower all the letters. Like: 'THIS IS AWESOME' is going to be 'this is awesome'.

- Stop words and encoding cleaning:

This is an essential part of the pre-processing where we clean the text from those stop words and encoding characters like \n or \t which do not provide a meaningful information to the classifiers.

- Bag-of-Words:

The machine learning algorithms are not going to work directly with texts. So, we have to convert them into some other form like numbers or vectors before applying machine learning algorithm to them. In this way the data is converted by Bag-of-Words (BOW) so that it can be ready to use in next round.

- TF-IDF:

One of the important features to be considered is this. TF-IDF (Term Frequency-Inverse Document Frequency) is a statistical measure to know the importance that a word carries in a document.

### C. Dataset Splitting:

The dataset of cleaned labels has been divided into a train set (75%) and a test set (25%). After the dividing was finished, the train set had features added. We used K-Fold cross-validation techniques to evaluate our model because our dataset was not completely balanced. 5 folds have been used to apply these techniques.

### D. Feature Extraction:

Due to the large number of words, terms, and phrases, learning from a large amount of data in text classification is quite difficult. The entire process consequently becomes very costly to compute. Any classification model's accuracy and performance are also hampered by irrelevant and repetitive features. In order to reduce the size of the large amount of data and prevent working with high dimensional data, it is therefore quite optimal to extract features. In this research, we have used two methods to extract features: Bag of Words and TF-IDF. The Bag of Words method uses each tweet as an input, counting how many times each word appears there. This yields a numerical representation of the text known as vector features, which have a set length. As a result, the frequency of each word in the text is encoded as a key-value pair in a count vector format for raw words. The "Term Frequency-Inverse Document Frequency" (TF-IDF) technique has also been used by us in our project for information retrieval. A statistical measure called TF-IDF gives text data that is used in mining numerical weights. By counting the number of times a term appears in the text data, it determines the relative importance of that term within the entire dataset. The primary characteristic of this method is the way that Term Frequency and Inverse Document Frequency interact. In other words, it balances out the uncommon words in the string to lessen the impact of the most prevalent ones.

### E. Classification Process:

With all the features previously mentioned, we have tracked the performance of MNB, LR, DT, GradientBoost, AdaBoosting, and Bagging on our dataset in this paper. With other performance metrics, we have used an ensemble of these ML algorithms and stacking classifier model to improve accuracy. We have created a voting classifier for all the algorithms we have employed for our detection scheme. Hard voting was used to create the ensemble frameworks in our suggested model. Due to the hard voting model, the ensemble model will classify a tweet as "offensive" if the majority of the classifiers in a classifier group do. Thus, compared to individually applied algorithms, the prediction results provided by our suggested scheme can validate the result with greater confidence.

After invoking "BoW" and "TF-IDF" from the cleaned data, the features have been applied to our proposed model to predict whether the text is "offensive" or "non-offensive," and various performance measurement metrics have been measured to assess the performance of our model.

In general, depending on the confusion matrix, several evaluation matrices are used to evaluate classifiers. Accuracy, precision, recall, and f-score are some of these requirements. The following equations are used to calculate them:

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

$$\text{Precision} = \frac{TP}{TP + FP}$$

$$\text{Recall} = \frac{TP}{TP + FN}$$

$$\text{F - Score} = \frac{2 * \text{precision} * \text{recall}}{\text{precision} + \text{recall}}$$

Where TP represents the number of true positive, TN represents the number of true negatives, FP represents the number of false positives, and FN represents the number of false negatives classes.

## 4. EXPERIMENTAL RESULTS

In order to identify cyberbullying from Twitter data, we have developed ensemble models. From noise-free data, "BoW" and TF-IDF have been created and fitted to our suggested model. Four well-known classifiers (MNB, LR, DT,

LinearSVC) and four ensemble methods (GradientBoost, AdaBoost, Extra Tree, and Random Forest) from a variety of machine learning algorithms were used to create our model. We have measured a variety of performance evaluation metrics to estimate the performance of our framework (Accuracy, F1-Score).

The table I showed how our models performed differently from individual ML models. We have achieved 87% accuracy for Stacking classifier when TF-IDF is used to extract features which has surpassed the

performance of other models. 71% accuracy has been attained when TF-IDF ('Bi-gram') is considered to retrieve features from tweets. Moreover, F1-Score and AUC results have been also satisfactory. We have achieved the lowest accuracy for TF-IDF ('Bi-gram') since N-gram models generally try to find the context of sentences based on bytes, words, syllables, or characters and there are less contextual texts in our dataset as it has been collected from Twitter. There were several imbalances in our dataset. We also evaluated our model using K-Fold cross-validation approaches to eliminate bias. In this study, 5-Fold Cross Validation was used.

**Table 1: COMPARATIVE ANALYSIS OF VARIOUS CLASSIFIERS**

	Models	Accuracy Scores
3	Extra Tree	0.813055
0	Random Forest	0.809399
2	AdaBoost	0.801567
7	Logistic Regression	0.801044
1	Gradient Boosting	0.795300
4	Decision Tree	0.763446
6	Naive Bayes	0.740992
5	Support Vector Machine	0.712272

**Table II: PERFORMANCE EVALUATION OF STALKING MODEL BASED ON CROSS-VALIDATION TECHNIQUES.**

RandomForest	ExtraTrees	AdaBoost	GradientBoost	stackingModel
0.843575	0.837989	0.832402	0.748603	0.821229
0.814607	0.803371	0.792135	0.786517	0.820225
0.814607	0.814607	0.820225	0.808989	0.825843
0.797753	0.775281	0.814607	0.775281	0.814607
0.859551	0.848315	0.848315	0.842697	0.870787

When the K-Fold cross-validation method was used, we were able to achieve 87% accuracy for the Stacking model. For other features as well, we have achieved successful performance measuring metrics findings.

## 6. CONCLUSION & FUTURE WORKS

Individuals, particularly teens, and society are constantly being affected by cyberbullying and offensive comments and posts on social media. These actions can have a number of negative effects, including victims having suicide thoughts. In this study, we developed ensemble-based algorithms to identify texts that are offensive or not. Every ML algorithm and ensemble technique that was used independently has been outperformed by our suggested model. For the Twitter extracted dataset, we have 87% accuracy. In the future, we'll aim to gather a variety of diverse datasets as well as some private datasets to evaluate the effectiveness of our model. As previously said, cyberbullying can take many different forms, including harassment, flame, denigration, imitation, racism, sexism, etc. Only two sets of data have been divided into

so far. The proposed model should therefore be expanded upon in order to see if it can also be used to solve the multi-class classification problem.

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# Purchasing behaviour of women towards Gold jewellery in Bangalore, Karnataka

Raaghavan L

**Abstract:** *Gold Industry has a significant position in the economic as well as cultural scenario of almost all the states of India. The focus of the study is to identify the various factors which influence women in purchasing gold. The Indian gold market is primarily used for trading in physical gold and gold Jewellery. Wearing gold has many ramifications and serves a variety of purposes in India. It is regarded as a status symbol. The market for gold Jewellery is thought to be expanding most quickly in India. In this study, primary research has been conducted. A Sample of 50 women respondents from Bangalore is collected by using Questionnaire method. This study indicates that buying gold is an investment option among the womens as a savings and investment vehicle. Therefore, this study focuses on the purchase behavior of Jewellery buyers in Bangalore.*

**Keywords:** Consumer Purchasing Behaviour, Gold Jewellery Purchasing, Word of mouth, Publicity, Advertisement.

# Vector Autoregressive Inflation Forecasting with Feature Selection via Traditional vs Machine Learning Methods

Atheesh Krishnan, S Ragul, K N Amarnath

## **Abstract:**

*Inflation can be defined as the loss of purchasing power of a fiat currency over a defined period of time. It plays a key role in designing the macroeconomic policy of central banks across the world. During periods of high growth rates, the inflation rate generally rises; deflation occurs during periods of low or negative growth rates.*

*Inflation forecasts are the bedrock of a sovereign nation's approach to monetary and fiscal policy, hence a grasp of the level of dependability of the predictions is imperative for crafting policy and legislation.*

*Price stability has been found to be one of the critical aims of the central banks of the emerging market by the Bank for International Settlements. In most market economies, the validity of macroeconomic forecasts is hindered by the dearth of accurate data, both in time series and cross-sectional formats. Given this limitation, this research uses a host of machine learning methods to generate optimal features and check if they can offer any improvements in prediction accuracy for headline Consumer Price Index inflation in the United States according to monthly Federal Reserve Economic Data.*

*This study compares three different Vector Autoregression models (VAR) in their in-sample forecasting. Optimal feature selection is performed using machine learning methods to use in some of these models. In contrast, one of the VAR models relies on a traditional technique of just choosing relevant variables based on classical economic literature. The goal of this study is to understand how feature selection from the Lasso regression and the XGBoost algorithm can improve the forecasting accuracy of vector autoregressive models (VAR).*

## **Keywords:**

Inflation, forecasting, vector autoregression, machine learning, feature selection, time series, BRICS, consumer price index

## Inventory Modelling Technology in Operations

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**ABSTRACT:** *The work on the subject of "Inventory modelling" started around 1920 and had a great increase after World War II. Most of it was structured and finalized at the beginning of the sixties. The resulting models constitute what can be called "traditional scientific inventory theory", which still is the basis for many commercial packages. These models contain very gross approximations, some very well known, other not explicitly mentioned, but rather easy to spot. Nevertheless, very little has been done in the last fifty years to improve the way inventory behavior has modelled to increase the very low degree of adherence with the real world. On the contrary, some further simplifications were suggested (see Graham, 1987) which, unfortunately, had some partial acceptance among practitioners and vendors of low-profile commercial packages.*

*A few years ago, some vendors realized the inadequacy of their models, especially on the treatment of slow-moving items, so they added "patches" to deal with this problem, like Croston's method (1970) or its derivation. This fixed the most apparent flaws without solving the problem (for example Mercia-Finmatica, SAP APO). Even the few vendors that are now selling some "inventory optimization" functionality have at best upgraded their inventory models to be more "complete" and closer to the 1968 "state-of-the-art". Yet we can't believe that you can find an optimal global inventory solution in a complex supply chain, when the basic descriptions of the stock-to-service relationships are unreliable.*

*A reliable stock-to-service curve is strongly influenced by the quality of the assumptions made about the demand probability distribution. The need for higher service levels, together with a trend toward smaller replenishment lot sizes, requires the right-end tail of the probability distribution to be sufficiently reliable even for high values of  $x$ . And this must also be true for slow to medium movers, which become more and more important in the product mix, due to product proliferation and the evolution of distribution network. The common approach to demand modelling is still based on some traditional assumptions, which are getting increasingly inadequate.*

*An inventory control problem can be solved by until several methods starting from trial- and -error methods to mathematical and simulation models. Mathematical models help in deriving certain rules which may suggest how to minimize the total (or incremental) inventory cost in case of deterministic demand or how to minimize expected cost in case of probabilistic demand.*

**Key words:** Inventory modelling, Inventory Optimization, Optimal global inventory solution, Probability Distribution, Demand Modelling and Mathematical Model

Inventory Management remains a critical factor of great concern for organization as they plan their e-business future. E-Inventory management is the true barrier of entry to e-commerce. A reliable stock-to-service curve is strongly influenced by the quality of the assumptions made about the demand probability distribution.

The traditional common approach:

- 1) The demand history is only considered in terms of quantity, totally ignoring customer order lines.
- 2) The main focus is on forecast accuracy, with very little attention given to the “stochastic”

Components.

- 3) The probability distribution of demand is directly derived from the distribution of the forecast errors.
- 4) The probability distribution of demand is generally assumed to be “normal”.
- 5) In the rare cases in which other probability distributions are available, besides the “normal”, it is difficult to find which fits best.
- 6) The presence of a limited number of probability distribution functions creates huge instability in switching from one to another(dramatic step changes if safety stock).

Advanced “Demand Modelling” is more realistic and assures more accurate results:

- 1) The demand history is collected and analysed both in terms of quantity and customer order lines, in order to better model the shape of of the demand probability distribution.
- 2) The main focus is on the “ stochastic“ component that is the “full” probability distribution of demand, from which the forecast is derived almost as a by-product.
- 3) The demand probability distributions ( order lines per period, quantity per order line, quantity per period) are derived from history in a coordinated fashion, which also allows detecting the additional variability potentially introduced by the forecasting model itself.
- 4) A wide variety of demand behaviours can be modeled, ranging from very fast movers to lumpy demand items, through a unique, proprietary, probability distribution function.

**Conclusion:** Such distribution function can assume an infinite number of shapes depending on a certain number of relevant parameters, allowing to manage any item in any stage of its life cycle with a self-adapting, seamless model, which guarantees an excellent degree of stability in all related parameters (safety stock in particular).

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# Tracking Human Movements In Large View Cases Using GBLN BCO and Model Based Particles

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**Abstract-** Tracking of object is an important task in the field of machine vision, where tracking using camera is widely used. The inexpensive video camera and the high quality lens generates a great interest in the object-tracking field. Generally, it is very difficult to track human movements in an environment having large view. There are very big problems associated with these camera system in tracing the people in large area and tracing of single person movement which is in nonlinear motion, handle occlusion and to reduce the time required to process the same. In this paper the new algorithm is proposed to solve the problems associated with the tracking of human in large view cases by using a GbLN-BCO & model based particle filter. The proposed algorithm is tested on the different database of video. The accuracy of the tracking perform is greater than unscented Kalman filter & Parzen Particle Filter.

**Keywords**—GbLN-BCO, Model Based, Particle Filter, Multiple Targets

## I. INTRODUCTION

Object tracking is very important and growing area in various fields of study. A wide range of applications of object tracking such as video conferencing, HCI, motion capture estimation, video surveillance crowd analysis etc., develops sustainable interest. The model of human body contains both the developments and the state of the body. There are two key steps in object tracking process, object detection and object tracing. Object detection means recognition of object in a given situation and object tracking means frame by frame tracking of the object. Tracking of objects is very difficult and complex in nature because of a few issues. There are some problems during the detection and tracking first the object's shape and size may change from frame to frame second is Partial and full occlusion. Third is Presence of commotion and obscure in video. And last is Luminance and power changes and object's sudden movement.

To perform tracking in video sequences, an algorithm examines the sequential video frames and give output as the movement of target between the frames. In the field of computer vision, the object tracking is one of the critical task [1]. The accessibility i.e. availability of high quality and cheap camera recorders and the increasing need for automated video analysis have generated a great deal of interest in numerous applications for example, in security frameworks for continuous temperature sensing in a SARS emission in East Asia, surveillance system frameworks that are utilized as a part of extensive shopping centers, ATM stalls, railroad stations and air terminals, observing frameworks, for example, for movement checking on a highway, military. The object tracking is very difficult because of the main issues in it like occlusion, multiple targets, and the object is in nonlinear motion.

In applications like video-surveillance and monitoring of human positions, the main idea is to recognize and track moving items (people, vehicles, and so on.) as they travel through the scene. Thinking of one as picture, distinct of moving articles ought to be isolated from the static condition. To distinguish and isolate

the moving article, distinctive approach has been proposed: foundation subtraction, 2D dynamic shape models, mix of movement, skin shading and face recognition. In the event that the camera is stationary or its development is little contrasted with the items, a basic subtraction of two continuous casings can be utilized. The subsequent picture has significantly bigger qualities for the moving parts of the casing than the stationary components [3]. A moving object produces two areas having extensive qualities, front locale of the object brought about by covering of the foundation by the object a rear region of the object caused by the uncovering of the object from the background [4]. Therefore, utilizing a threshold of the image it is conceivable to identify the rear region of the moving object. The edge esteem i.e. threshold value is determined by examinations. . The binary threshold image can contain some noise which can be easily removed with an erosion process or with a median filter. The primary objectives of movement studies are to detect moving humans (points, features, areas), estimate the motion from past reviews, it has been found that occlusion is a main problem in the object tracking. It is not much easy to track the human movements in the crowded scenes because the ratio of occlusion is increases in crowds scenes because the obstruction level are high.

In a crowded situation, the background or the foreground (object) is alert and become ambiguous. Moreover, the question being followed nearly looks like different items introduce in nature, making it hard to recognize the focused on protest from the foundation. In the circumstance when a followed protest goes into impediment, a few frameworks will lose data making it difficult to estimate the trajectory of an object.

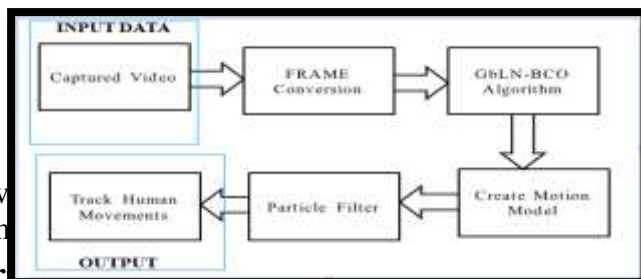
Additionally, the combination of various movements makes the tracking of multiple objects more challenging for example, in surveillance and monitoring systems that arrangement with perception of numerous individuals' development in crowd space, for example, railroad stations, airplane terminals and roadways. Therefore, it is basic for the frameworks to have the ability to screen numerous objectives. Consequently, the following framework must have the capacity to track and distinguish the development of each question in a gathering of moving objects in a crowded environment.

**II. RELATED WORK**

To detect human movements in a large view is very easy task but to track human movements behaviour in a large view is very difficult task. There are four main problems associated with the tracking which are multiple targets in nonlinear motion, relative size of the targeted object, occlusion and processing time.

*A. System Overview*

The below figure is the block diagram of the proposed system which is further divided into two parts i.e. GbLN-BCO algorithm and particle filter for motion model. In which the human tracking is done. The brief description of the both parts is given below.



Here w of fram the input to the system. The video contains the no ing the size of frames 250\*250.

• **Fr** system is the audio video interface file. For the detection of the object, video is converted into frames having the frame rate of 20\s and Bit per Pixel of 24. The height & width of the file format is 768\*1024.

• **Pre Processing:** - Image pre-processing typically denotes a processing step transforming a source image into a new image, which is fundamentally similar to the source image, but differs in certain aspects, e.g. improved contrast. According to the above definition, pre- processing results in changing the brightness

of individual image pixels. This step includes the physical transformation of the RGB and the gray scale image.

- **Median Filter:** - It is a nonlinear type of digital filter, which is used to remove the noise from the signal and image. It is used to enhance the quality of the signal. The advantage of the median filter it gives the precise output and it preserves edges while removing noise.
- **Foreground Detection:** - The purpose of the foreground detection is to detect the changes in the image sequences. For the tracking purpose, we do not need the entire background image so the foreground detection is used for the detection of the moving part.
- **Bacteria Colony Optimization:** - In this optimization the artificial bacteria is used for detection. For the detection of the target the bacteria goes from the 5 stages i.e. Chemotaxis, Elimination, Reproduction and Migration, Communication. The Chemotaxis & Communication is used to update the positions of the bacteria. Bacteria swim by rotating whip-like flagella. The bacteria are used to track the object.
- **Particle Filter:** - In a particle filtering a set of particles are used to track the object. The particle filter methodology is used to solve Hidden Markov Chain (HMM) and nonlinear filtering problems arising in signal processing and Bayesian statistical inference.
- **Tracked Output:** - The BCO is used for the detection of the target and the particles filter is used for the tracking purpose.

#### B. *Bacterial Colony Optimization*

Swarm intelligence is the emergent collective intelligent behaviors from a large number of autonomous individuals. It provides an alternative way to design novel intelligent algorithms to solve complex real-world problems. Different from conventional computing paradigms, such algorithms have no constraints of central control, and the searching result of the group will not be affected by individual failures. Swarm intelligent algorithms maintain a population of potential solutions to a problem instead of only one solution. Nowadays, most of swarm intelligent optimization algorithms are inspired by the behavior of animals with higher complexity. Particle swarm optimization PSO was gleaned ideas from swarm behavior of bird flocking or fish schooling. Ant colony optimization ACO was motivated from the foraging behavior of ants. Artificial fish swarm algorithm AFSA was originated in the swarming behavior of fish, and artificial bee colony algorithm was stimulated by social specialization behavior of bees. However, the states of the above-mentioned animals are more complex, and their behaviors are difficult to describe qualitatively.

As prokaryote, bacteria behave in a simple pattern, which can be easily described. Inspired by the foraging behavior of *Escherichia coli* E. coli in human intestines, Passion proposed an optimization algorithm known as bacterial foraging optimization BFO recently. Since then, a growing number of researchers who paid great attention to this field began to divert their concentrations on this new algorithm and extended the concept to algorithms such as fast bacterial swarming algorithm FBS, bacterial-GA foraging algorithm and adaptive bacterial foraging algorithm ABFO. Except those new proposed algorithms, improvements of bacterial foraging optimization BFO were considered by investigators. Some of the key models involve the discussion of chemotaxis step length BFO- LDC and BFO-NDC or adaptive chemotaxis step. These researches on bacterial foraging optimization suggested that predicting and controlling the dynamical behavior of microbial colonies might have profound implications in reality. However, traditional bacterial behavior-based algorithms BFO or BC only considered individual behaviors instead of social behaviors with swarm intelligence. Each individual in the colony independently searches for food by their own experience without any information exchange with others. What made the situation worse are the complicated characteristics of the original bacterial behavior-based algorithms. Taking BFO for example, long period has been spent on random chemotaxis. Additionally, the chemotaxis, reproduction, elimination and dispersal processes are inner iterations that lead to high computation complexity. The frequency of chemotaxis, reproduction, elimination, and dispersal is predefined without considering the environmental dynamics. To deal with the aforementioned problems, we propose a new bacterial behavior based optimization algorithm—bacterial



colony optimization BCO to formulate bacteria's behavior with swarm intelligence.

### C. Implementation of Chemotaxis and Communication

Bacteria chemotaxis all lifetime can be divided into two models: tumbling and swimming. In the process of tumbling, a stochastic direction participates into actually swimming process. Therefore, turbulent director and optimal searching director altogether influence the search orientation in tumbling, update the positions of each bacterium, whereas no turbulent director acceding in swimming process to affect the bacteria swimming toward optimal is formulated

$$\begin{aligned}
 \text{Position}_i(T) &= \text{Position}_i(T-1) + C(i) \\
 &\quad * \left[ f_i * (G_{\text{best}} - \text{Position}_i(T-1)) + (1 - f_i) \right. \\
 &\quad \left. * (P_{\text{best}_i} - \text{Position}_i(T-1)) + \text{turbulent}_i \right], \\
 \text{Position}_i(T) &= \text{Position}_i(T-1) + C(i) \\
 &\quad * \left[ f_i * (G_{\text{best}} - \text{Position}_i(T-1)) + (1 - f_i) \right. \\
 &\quad \left. * (P_{\text{best}_i} - \text{Position}_i(T-1)) \right],
 \end{aligned}$$

where  $f_i \in \{0, 1\}$  and  $\text{turbulent}_i$  is the turbulent direction variance of the  $i$ th bacterium.  $G_{\text{best}}$  and  $P_{\text{best}}$  are the globe best or personal best position of the  $i$ th bacterium.  $C_i$  is the chemotaxis step size. The BCO uses the adaptive chemotaxis step referred to Niu et al.

$$C(i) = C_{\min} + \left( \frac{\text{iter}_{\max} - \text{iter}_j}{\text{iter}_{\max}} \right)^n (C_{\max} - C_{\min}),$$

Where  $\text{iter}_{\max}$  is the maximal number of iterations,  $\text{iter}_j$  is the current number of iterations, and  $C_i$  is the chemotaxis step of the  $i$ th bacterium. With  $C_{\max}$   $C_{\min}$ , the system becomes a special case of fixed chemotaxis step length, as the original proposed BFO algorithm. If  $n = 1$ , it is the linearly decreasing strategy of chemotaxis step. Otherwise, chemotaxis size is changing with a nonlinear decreasing strategy. Simple low- dimension problems prefer to linear decreasing strategy of chemotaxis step, but in high dimension multimodal complex problems, nonlinear decreasing strategies of chemotaxis step are more popular.

## III. RESULT AND DISCUSSION

The computer vision is an interdisciplinary field that deals with the how computer can be made to gain a high-level understanding from a digital image or video. Now a day the scope of the video tracking is increased due to advancement in camera tracking system.

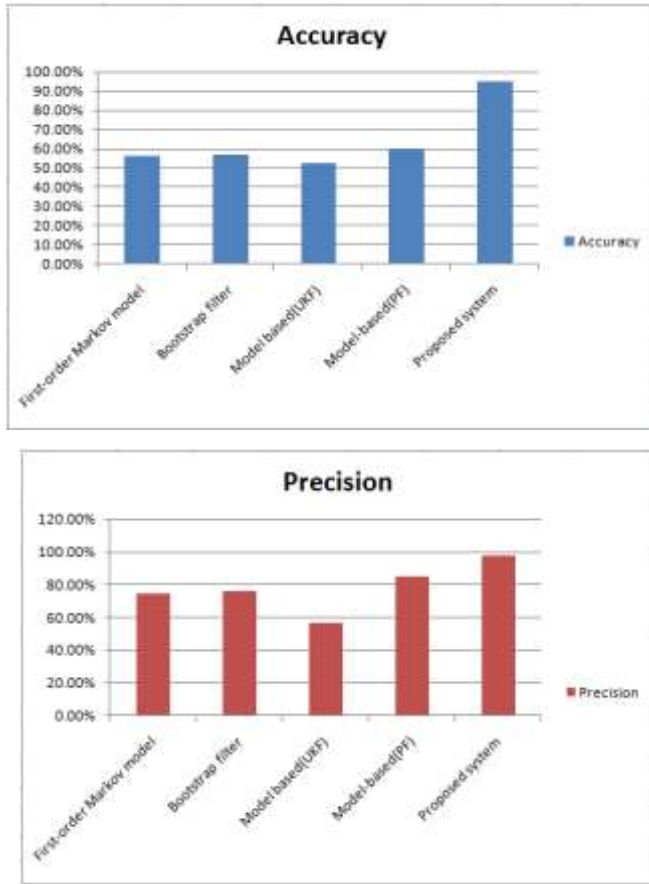
There are various video surveillance dataset available on internet some of the sources are listed below:

1. LHI
2. NGC
3. Caltech- Pedestrian
4. PETS

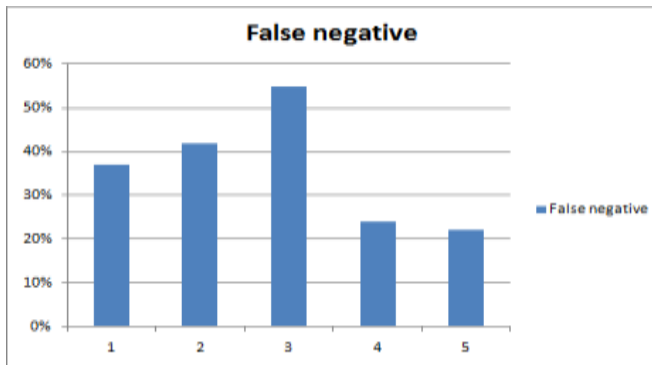
D. This dataset is in video format so there are various file format namely MP4, MOV, WMV, and AVI. Therefore, here we are using the Caltech- Pedestrian's AVI type of the dataset.

E. The Caltech Pedestrian Dataset consists of approximately 10 hours of 640x480 30Hz video taken from a vehicle driving through regular traffic in an urban environment. About 250,000 frames (in 137 approximately minute long segments) with 350,000 bounding boxes and 2300 unique pedestrians were annotated. The annotation includes temporal correspondence between bounding boxes and detailed occlusion labels

F.



The above graph shows the accuracy and precision of the proposed system is greater than the previous implemented algorithms.



The above graph shows the false negative of the proposed system is lesser than previous implemented algorithms. Lesser the false negative greater the accuracy of the system.

## CONCLUSION

The proposed method is used to track the human and objects in a large view. The GbLN algorithm is used to track the object efficiently and it reduces the processing time. GbLN- BCO algorithm is used to speed up the template matching process, and consequently reduces the processing time in order to search the object location the proposed method with particle filter has the ability to steadily track the locations of multiple human movements that move in different directions. In addition, this method can accurately

recognize the object region and is able to distinguish the different object movements, during the process of occlusion or after the objects have occluded. Moreover, the technique can classify the various types of pre-defined partial and full object occlusion. The results from the study also show that the Parzen particle filter is able to accurately recognize objects that are overlapped, but is unable to accurately recognize the object region. Consequently, it is unable to accurately distinguish the overlapped objects. The accuracy of the tracking perform is greater than the previous techniques i.e. unscented Kalman filter & Parzen Particle Filter.

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# Car Parking Occupancy Detection Using Smart Camera Networks and Deep Learning

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## **Abstract:**

*This paper presents an approach for real-time car parking occupancy detection that uses a Convolutional Neural Network (CNN) classifier running on-board of a smart camera with limited resources. Experiments show that our technique is very effective and robust to light condition changes, presence of shadows, and partial occlusions. The detection is reliable, even when tests are performed using images captured from a viewpoint different than the viewpoint used for training. In addition, it also demonstrates its robustness when training and tests are executed on different parking lots. We have tested and compared our solution against state of the art techniques, using a reference benchmark for parking occupancy detection.*

**Keyword:** Deep Learning, Convolutional neural network

## **Introduction:**

Techniques for car parking occupancy detection are of great importance for an effective management of car parking lots. Knowing in real-time the availability of free parking spaces and communicating to the users can be of great help in reducing the queues, improve scalability, and the time required to find an empty space in a parking lot. In many parking lots, ground sensors are used to determine the status of the various spaces. This requires installation and maintenance of sensors in every parking space, which might be expensive, especially in parking lots with high number of spaces available. Recently, various techniques relying on the use of video cameras have been proposed to monitor the occupancy of parking lots. However, despite these fine efforts, vacant parking space detection using only visual information is still an open problem. Most of these approaches rely on specialized visual techniques tailored to the specific scenario, and lack of generalization when applied to different parking lots. In this paper, we provide a distributed, effective, efficient and scalable solution for real-time parking occupancy detection, based on deep Convolutional Neural Networks (CNN). The proposed solution for parking detection follows the trend of applying Deep Learning techniques, specifically CNNs, to problems that require a high-level of abstraction to be solved, such as vision. Thanks to deep CNNs, the proposed solution is

robust to disturbances due to partial occlusions, presence of shadows, variation of light conditions, and exhibits a good generalization property. In fact, the quality of the results are maintained when we considered parking lots and scenarios significantly different from the ones used during the training phase. Moreover, the classification phase needs low computational resources, making it suitable for embedded environments such as Raspberry Pi. In the context of vehicle detection, the only work of which we are aware of using CNN is the one presented in [6], which uses a multi-scale CNN to detect vehicles in high-resolution satellite images.

## **Dataset Description:**

To validate our approach we performed tests using PKLot , a dataset for parking lot occupancy detection. Besides, we built an additional dataset, called CNRPark, using images coming from smart cameras placed in two different places, with different point of views and different perspectives of the parking lot of the research area of the National Research Council (CNR) in Pisa. The CNRPark dataset contains images taken in different days, with different light conditions, and includes occlusion and shadow situations that make the occupancy detection task more difficult. The proposed dataset has been manually and exhaustively annotated, and made available to scientific community for defining new algorithms for car park occupancy detection. More details about the CNRPark dataset will be given below. The usage of these two datasets, coming from two different parking lots and scenarios, allowed us to test the generalization property of our approach, by training on one scenario and testing in a completely different one. To the best of our knowledge, there are no other experiments where this type of generalization property has been tested.

### **Methodology:**

We use preprocessing technique like Pixel bright transformation , Geometric Transformation.

### **DEEP LEARNING FOR OCCUPANCY DETECTION:**

In this paper, we propose an approach for the detection of car parking occupancy based on Deep Learning. Deep Learning (DL) is a branch of Artificial Intelligence that aims at developing techniques that allow computers to learn complex perception tasks, such as seeing and hearing, at human level of accuracy. It provides near-human level accuracy in image classification, object detection, speech recognition, natural language processing, vehicle and pedestrian detection, and more. A Deep Learning approach particularly effective for vision tasks exploits Convolutional Neural Networks (CNN). A CNN is composed of a possibly large number of hidden layers, each of which performs mathematical computations on the input and produces an output that is given in input to the following layer. A CNN differs from classical neural networks for the presence of convolutional layers, that are able to model and discern the spatial correlation of neighboring pixels better than normal fully connected layers. For a classification problem, the final outputs of the CNN are the classes for which the network has been trained on. On one hand, the training phase is usually computationally expensive and it may take a long time. On the other hand, once the network has been trained, the prediction phase is quite fast and efficient. We trained two different CNNs and we used the trained neural networks to decide about the occupancy status of the individual parking spaces seen by the video cameras .Using smart cameras, rather than ground sensors, has two relevant advantages: lower cost and versatility. The cost of a Raspberry Pi equipped with a camera module is about 80e, and the outdoor camera box with pole support has about the same price. One single camera placed on the roof of a 3-floors building, as in our case, can monitor, on average, about 50 parking spaces located in front of the building, thus reducing the cost per single space to a few

Euros. The cost of using one ground sensor, per parking space, is one order of magnitude higher. As will be shown in Section III, the accuracy of the proposed approach is high, and it is comparable to the accuracy of the ground sensors. Therefore with a limited expense, compared to installing a single ground sensor for each parking space, it is possible to monitor a large parking lot with comparable accuracy results.



Parking space patches are segmented and numbered as shown in the two images, respectively forming subset A (on the left) and B (on the right).

In the following, we describe the algorithm for determining the parking space status, which rely on the use of CNN and we give a brief description of the CNNs that we used in our solution.

## **Parking Space Status Classification**

The system that we built periodically captures the image of a portion of the parking lot and, for each parking space, determines the occupancy status by using the trained CNN. Pictures captured by cameras are filtered by a mask that identifies the various parking spaces. The mask was built once for all manually. Examples of masks built for two different cameras are shown in Figure 1. At run time, each frame is automatically segmented in the patches (the portion of the original image containing a single parking space) corresponding to the parking spaces monitored by that camera, by using the generated masks. Every patch is then classified using the trained CNN, to decide if the corresponding parking space is empty or busy.

## **Convolutional Neural Networks**

We tested two CNN architectures, named mAlexNet and mLeNet ('m' stands for 'mini'), which are known to be successful in visual recognition tasks. These networks have less than five trainable layers in order to make the computations feasible in real-time on the embedded device. This limitation is reasonable since the original architectures are designed for large scale visual recognition tasks, which are way more complex than our binary classification problem. In fact, we observed through experiments that the reduced architectures can cope easily with the car parking occupancy detection problem. Both architectures take a 224x224 RGB image as input, therefore each patch is normalized accordingly before the training. mLeNet is based on LeNet-5, proposed by [10], having two convolutional layers followed by max pooling and two fully connected layers. The first layer (conv1) is similar to the one proposed to be more suitable for a 224x224x3 input image. Layers conv2 and fc4 have a reduced number of filters and neurons with respect better suit a binary classification task without overfitting. For fc5, the last Gaussian RBF (radial basis function) layer is replaced with a classical inner product layer acting like a 2-way soft max classifier. mAlexNet is based on AlexNet, where we dropped the third and fourth convolutional layers and a fully connected layer. All convolutional layers conv1-3 are followed by max pooling, local response normalization (LRN), and linear rectification (ReLU), except for conv3 where no LRN takes place. The number of filters of conv1-3 and the number of neurons in fc4 are drastically reduced to fit the problem dimension. For fc4-5, no dropout regulation is adopted. Both architectures have a dense connection between convolutional layers.

## **Conclusion:**

In this paper, we proposed and evaluated an approach for parking status detection, which uses Convolutional Neural Networks to classify the parking space occupancy directly on board of a Raspberry Pi camera. Each camera is able to cover a large portion of a parking lot by monitoring simultaneously about 50 parking spaces. In order to validate our approach, we have created a dataset, CNRPark, containing images of a real parking lot taken by smart cameras. The dataset has been made available to the scientific community to develop and compare new techniques of car parking occupancy detection. Moreover, we compared the presented approach with other state-of-the-art approaches based on non-deep (shallow) machine learning, and tested on the PKLot dataset, a very large publicly available dataset of parking lot

images. Our experiments show that convolutional neural networks are effective to be applied to the addressed problem. Specifically, they exhibit very high accuracy, even in presence of noise due to light conditions variation, shadows, and partial occlusions. We have also tested our approach using a test set produced with a camera placed in a different place (viewpoint and perspective), with respect to the training set. Results also show that CNNs have good generalization capabilities in predicting parking status when tested on a dataset completely different from the training dataset. The proposed method is also robust to non-standard parking behaviours, such as cars occupying multiple parking lots. In that case, our solution tends to classify both slots as busy. However, an in-depth analysis of the performance in non-ideal situations, such as night, foggy, or snowy conditions, is left to future work.

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## Investments And Outcomes!

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### **Abstract**

*The topic of this study is how an investor will recognize better investment opportunities. In the lives of people, money is critical. Depending on the individual demands of each investor, an investment may be suitable for one type of investor but unsuitable for another.*

*The majority of individuals save a portion of their income. Contrarily, investing is the process of putting money that has been saved aside into financial items to produce income in the future. People's saving behaviors are improved by investments, particularly in rural areas.*

*The various methods of investing money are known as "investment outlets." They are also known as "investment alternatives" or "investment strategies." Money that is invested has the potential to grow. Through investment, a person can successfully direct his or her money.*

There are numerous investment opportunities as follows:

- ➤ Physical Investments:
  - o Real Estate
  - o Silver and gold.
  - o Art
  -
- ➤ Financial investment:
  - o Marketable Investments (Negotiable Securities) ▪ Equity Shares
  - ▪ Preference Shares
  - ▪ Bonds
  - ▪ Government Securities
  - ▪ Money Market Securities
  - ▪ Savings Certificates
  - 
  - o Non-Marketable Investments (Non-negotiable Securities) ▪ Deposits
  - ▪ A Tax-Sheltered Savings Scheme
  - ▪ Mutual Funds
  - 
  -

**Quotes for Investment:**



“Do not save what is left after spending; instead spend what is left after saving.” Warren Buffett.

### **Keywords**

Investment Planning, Advisory, Allocation of Savings, and Finance Strategy. 2 Name of the first author and second author

### **The Importance of Investment**

Money invested is the process of spending funds on assets in order to generate income or capital appreciation. Investment is the amount of money saved from current consumption in the expectation of obtaining some benefits in the future. As a result, it is a reward for having to wait for money. Individuals' savings are invested in assets based on their risk and return requirements, liquidity, available investment avenues, various financial institutions, and so on. Appropriate decisions must be made in order to achieve the objectives.

“Investment is the purchase of a financial asset that produces a yield that is proportional to the risk assumed over some future investment period.”

- F. AMLING

There are two concepts associated with investment. Specifically, the economic and financial concepts of investment.

Investment is related to both economic and financial concepts because it is a component of individual savings that flow into the capital market either directly or through institutions. As a result, investment and financial decisions interact with one another. Financial decisions are primarily concerned with the sources of money, whereas investment decisions are traditionally concerned with the uses or budgeting of money.

#### **Economic Investment:**

Economic investment is defined as adding to society's capital stock. This investment refers to money spent on purchasing new or replacing a company's capital assets. All items required to produce goods or services are considered capital assets in this context. Retail stores, factories, equipment, and other similar investments are examples. Investments in raw materials will also be classified as economic investments. This concept also includes inventories and human capital. An investment, in economic terms, is an increase in building, equipment, and inventory.

#### **Financial Investment:**

Financial investment is a much broader concept, and economic investment is a subset of it. This is the allocation of financial resources to assets that are expected to generate a profit or return over a specified time period. People put their money into things like stocks, debentures, fixed deposits, national saving certificates, life insurance policies, provident funds, and so on. According to them, investment is a commitment of funds to generate future income in the form of interest, dividends, rent, premiums, pension benefits, and capital appreciation.

## 2 Various Types of Investment Opportunities

Many people are intimidated by investing because there are so many options, and it can be difficult to determine which investments are appropriate for your portfolio. This guide will walk you through the most common types of investments.

### Type 1 Physical Investments

### Type 2 Financial Investments

#### 2.1 Physical Investments

A real investment is something tangible that can be touched. It is an investment in a tangible or movable asset.

##### 2.1.1 Real Estate

Real estate is defined as immovable property such as land and everything permanently attached to it, such as buildings. On a long-term basis, real estate offers a higher rate of return than avenues such as corporate deposits. Residential land and properties are examples of investment real estate. Homes, townhouses, and condominiums are common types of residential investments.

##### 2.1.2 Silver and Gold

Gold and silver were regarded as valuable metals by ancient civilizations. Precious metals have a place in the portfolio of any value investor today. This is a type of investment among rural and semi-urban residents. Gold and silver are two popular investments for those seeking assets that can serve as a store of value as well as an inflation hedge. Remember that neither asset generates cash flow, so investors may be better served in the long run by taking a buy-and-hold approach with a portfolio of profitable and growing stocks.

##### 2.1.3 Art

Art is a long-term investment, and while the art market can be stable or show large returns on investment during boom times, it is one asset that can easily lose value during recessions.

#### 2.2 Financial Investments

A financial investment is an asset in which you invest money in the hope of it growing or appreciating into a larger sum of money. It refers to the use of funds in the form of assets with the goal of generating additional income or increasing the value of the investment in the future. The assets that are the subject of investment can be classified as safe or risky.

##### 2.2.1 Marketable Investments (Negotiable Securities)

These are financial instruments that can be easily traded and converted into cash in a short period of time.

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### 2.2.1.1 Equity Shares

Some marketable securities generate income, which varies over time. These securities are riskier than debt instruments. There is no guaranteed return, but when we buy a share of a company, we become owners to the extent of our investment.

### 2.2.1.2 Preference Shares

Preference shares, also known as preferred shares, are a form of investment that resembles both common stock and fixed-income instruments. When it comes to dividends paid by the corporation, holders of preference shares are usually given first priority.

Preference shares allow an investor to possess a stake in the issuing firm in exchange for receiving dividends first.

Shares are entitled to certain preferential rights. Some of its features are similar to bonds, whilst others are similar to equities. Shareholders with these shares must be paid before those with ordinary shares when a company is paying dividends or if it goes bankrupt. These holders do not have any voting power, except in cases where a dissolution affects their rights. Preferred shares are also referred to as "non-votable shares".

#### **Definition.**

As Section 81(1) of the Companies Act, 1956 defines, "A preference share is a share which carries preferential rights as to the payment of dividend at a fixed rate either free or subjected to income tax and as to the payment of capital at the time of liquidation prior to the equity share holder."

### 2.2.1.3 Bonds

A bond is a type of debt security. It is a long-term debt instrument that promises to pay a fixed annual interest payment for a set period of time.

When you purchase a bond, you are making a loan to the issuer, which could be a government, municipality, or corporation. In exchange, the issuer promises to pay you a specified rate of interest throughout the bond's life and to repay the principal, also known as the face value or par value of the bond, when it "matures," or comes due after a set period of time.

### 2.2.1.4 Government Securities

The term "government security" refers to a variety of investment products offered by a government organisation. Many governments will issue these debt instruments in order to fund ongoing operations. Government securities guarantee the full repayment of invested principal when the security matures. Some government securities may also pay out coupons or interest on a regular basis.

### 2.2.1.5 Money Market Securities

The money market refers to trading in very short-term debt investments. These securities have a very short maturity period, usually less than a year.

The common financial market instruments are as follows:

- • Treasury Bills (T-bills)
- • Commercial Papers

### 2.2.1.6 National Saving Certificates (NSC)

The National Savings Certificate (NSC) is a fixed-income investment plan available at any post office branch. This is an initiative — led by the government.

Anyone looking for a safe investment opportunity to earn a consistent income while saving taxes can invest in NSC. NSC provides interest guarantees as well as complete capital protection. This instrument can be used to earn tax saving interest up to Rs.1 lakh per year u/s 80C.

### 2.2.2 Non-Marketable Investments (Non-Negotiable Securities)

Non-marketable assets are those that cannot be liquidated in cash in a timely or cost-effective manner.

#### 2.2.2.1 Deposits

Deposits are one of the best investment options for people looking for a consistent and secure return on their money.

Deposits are classified into two types:

- Recurring Deposits:

A recurring deposit invests a fixed sum of money at regular intervals. This interval is typically once a month. Until the investments reach maturity, they earn interest. The amount of money and the duration of the recurring deposit cannot be changed once they are set. Some banks allow you to convert your recurring deposit to a fixed deposit when it matures.

- Fixed Deposits:

Fixed deposits are deposits in which a specific sum of money is invested for a set period of time. A Fixed Deposit, like a Recurring Deposit, cannot be withdrawn until the maturity period. Premature withdrawal is permitted after the bank assesses a penalty in the interest rate.

#### 2.2.2.2 Tax-Sheltered Saving Schemes

A tax-sheltered investment is an asset purchased or structured to legally reduce your income tax liabilities. A tax shelter is any legal strategy used to reduce your current or future income tax liabilities. Tax shelters can take many different forms and include a variety of tax deductions and credits.

These are the schemes that offer tax breaks on savings. These are examples of schemes:

- Employee Provident Fund Scheme (EPF)
- Public Provident Fund Scheme (PPF)
- National Savings Scheme (NSS)
- National Saving Certificate (NSC)
- Life Insurance (LIC)

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### 2.2.2.3 Mutual Funds

A mutual fund is a pool of money managed by a professional fund manager. A mutual fund is a company that pools money from many investors and invests it in securities such as stocks, bonds, and short-term debt. It is a trust that collects funds from a group of investors who share a common investment goal. The funds are then invested in stocks, bonds, money market instruments, and/or other securities. Each investor owns units, which represent a portion of the fund's holdings. After deducting certain expenses, the income/gains generated from this collective investment are distributed proportionately among the investors by calculating a scheme's "Net Asset Value, or NAV."

#### **Theorem.**

The mutual fund theorem was introduced by James Tobin, who worked alongside Harry Markowitz from 1955 to 1956 at the Cowles Foundation at Yale University. The mutual fund theorem follows the principles of modern portfolio theory, which Markowitz studied at the Cowles Foundation. Markowitz received the Nobel Memorial Prize in Economics.

### 3 Asset Allocation by Age

<b>Age</b>	<b>Stocks</b>	<b>Bonds</b>
20s	80% to 90%	10% to 20%
30s	70% to 80%	20% to 30%
40s	60% to 70%	30% to 40%
50s and 60s	50% to 60%	40% to 50%
70s and 80s	30% to 50%	50% to 70%

#### Bottom Line

“The best time to plant a tree was 20 years ago. The second-best time is now.”

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# Youtube Reach Analysis Using Machine Learning

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## **Abstract**

*There's enormous growth and fashionability of YouTube. It has all implicit to move billion of lives encyclopedically as the number of observers is growing day by day. Nearly billions of vids are watched on YouTube every single day, generating a huge quantum of data daily. YouTube data is actually in unshaped form, so there's great demand to store the data, process the data and assaying the data. This analysis will help in discovering how people are performing on YouTube, one can fluently identify what content works best on YouTube. The primary purpose of this design is to find how real time data can be anatomized to get the rearmost analysis and trends in YouTube. The analysis is done using stoner features similar as views, commentary, likes, and dislikes. Analysis can be performed using machine literacy models and python libraries like pandas, matplotlib library to classify the YouTube data and gain useful information.*

## **Keywords**

Machine Learning, Random Forest, SVM, Decision Tree

## **Introduction**

As we all know using and watching YouTube videos is an important part of our everyday lives. Most people are trying to build their influence, income, and impact with YouTube and online video. In nutshell, everyone is trying to be a YouTube influencer. It will be nice if a YouTube influencer can get an idea of how the view count is going to be before making and finalizing the video. In here we tried to create a model that can help influencers to predict the number of views for their next video. This research helps YouTube to analyse and predict the lifecycle of a trending content so that it can build its business model around that content accordingly. Content creators or as they are called YouTubers also generate revenue from their videos. YouTube is the sole source of income for a lot of YouTubers and this study will help creators to analyse their contents life cycle and make improvements in required areas. YouTube, a Google association, has north of a billion customers and produces billions of points of view. Since YouTube data is getting made in an especially colossal aggregate and with a correspondingly extraordinary speed, there is a gigantic interest to store, process and circumspectly focus on this tremendous proportion of data to make it usable.

## **Proposed Method**

The proposed system mainly focuses on YouTube views and category prediction. By Considering the tags of the video, we predict the YouTube views using Random Forest Regressor. And also, we predict the categories for the given titles of YouTube videos. We analyze the data and bring more insights for the content creators so that would be helpful for them. During the analysis of previous papers, we choose Random Forest which have a greater accuracy rate and also included certain parameters which improves the accuracy and prediction.

We have used dataset from Kaggle and imported the required packages. The data set contains 37924rows & 18columns. We have analyzed the YouTube data & inferred some of the insights from the data so that would be helpful for new content creators. We have observed that the same video can be on trending

various times for consecutive days. We can see the difference in the number of views, likes, dislikes, comment count as the time progresses. While working with the information we've seen that numerous video pattern on different occasions. This should be possible utilizing the functions from panda's libraries on information outline containing the number of times the channel was on trending section. Amount of count for each channel is determined & afterward plotted in diagram with the assistance of python's matplotlib.

## 1.Training ML Algorithm

For youtube viewprediciton we consider the following algorithms

### **Linear Regression**

It performs a regression task. Regression models a target prediction value based on independent variables. It is mostly used for finding out the relationship between variables and forecasting.

### **Ridge Regression**

In ridge regression, however, the formula for the hat matrix should include the regularization penalty:  $H_{\text{ridge}} = X(X'X + \lambda I)^{-1}X'$ , which gives  $d_{\text{ridge}} = \text{tr}H_{\text{ridge}}$ , which is no longer equal to  $m$ . Some ridge regression software produce information criteria .

### **Randomized Search**

Random search is **a technique where random combinations of the hyperparameters are used to find the best solution for the built model**. It is similar to grid search, and yet it has proven to yield better results comparatively

### **Lasso regression**

Lasso regression is **a type of linear regression that uses shrinkage**. Shrinkage is where data values are shrunk towards a central point, like the mean. The lasso procedure encourages simple, sparse models .

### **Elastic Net**

The elastic net method **performs variable selection and regularization simultaneously**. The elastic net technique is most appropriate where the dimensional data is greater than the number of samples used. Groupings and variables selection are the key roles of the elastic net technique

### **Decision Tree**

A decision tree is a decision support tool that uses a tree-like model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility. It is one way to display an algorithm that only contains conditional control statements.

### **Support Vector Machine**

SVM works by **mapping data to a high-dimensional feature space so that data points can be categorized, even when the data are not otherwise linearly separable**. A separator between the categories is found, then the data are transformed in such a way that the separator could be drawn as a hyperplane.

### **Random Forest**

Random forests or random decision forests is an ensemble learning method for classification, regression and other tasks that operates by constructing a multitude of decision trees at training time. For classification tasks, the output of the random forest is the class selected by most trees.

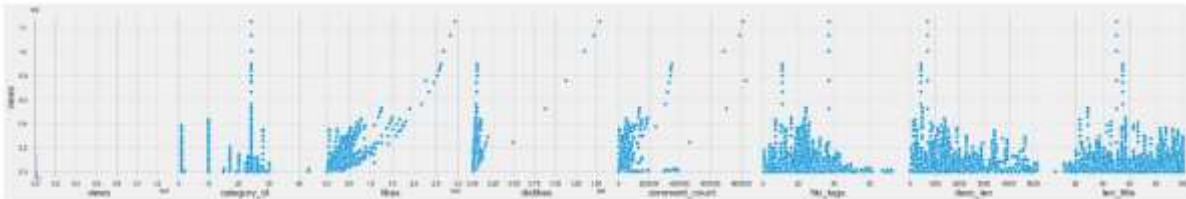


## 2 Experiments and results:

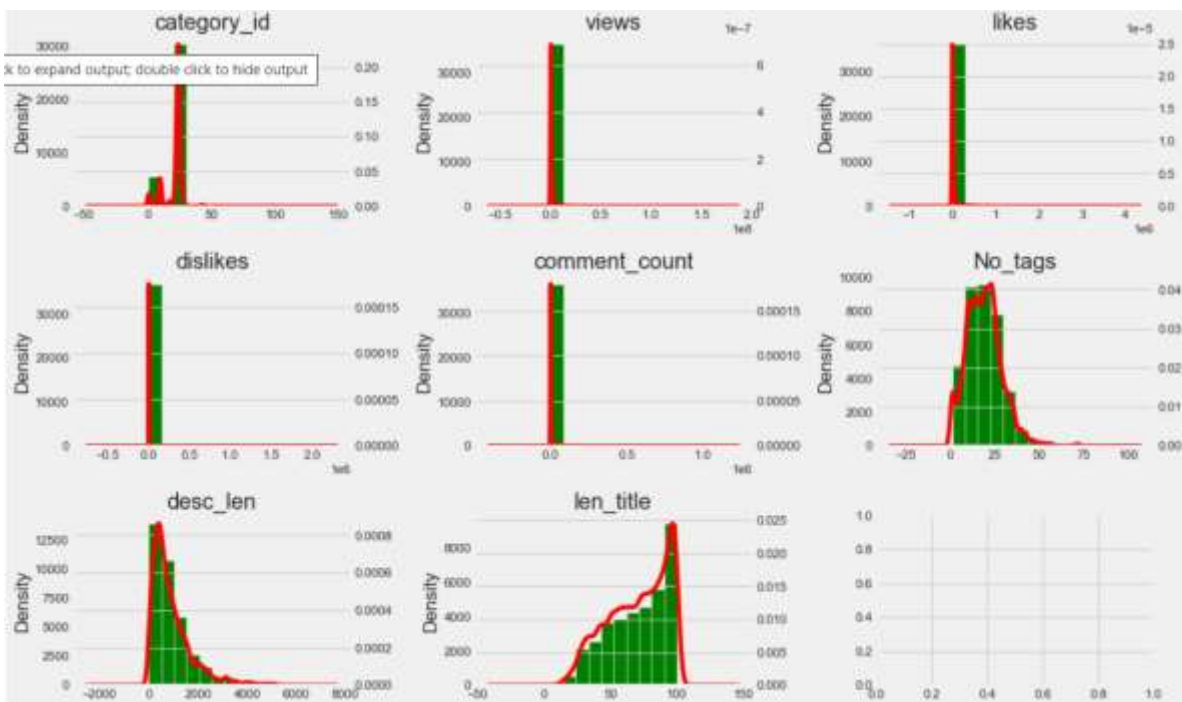
To evaluate accuracy of these images, manually counting is done; hence the actual count also may not be completely accurate due to human error. Validation of those estimated results with the output of the crowd-count algorithm is required. The Machine Learning is evaluated on the basis of 2 metrics MAE and MSE. Mean Absolute Error (MAE) is absolute difference of 2 continuous variables given below, In the above formula,  $M$  is single test sequence images and  $C_i$  GT represents the count from ground truth and  $C_i$  represents the estimated count by using the proposed methodology

$$MAE = \frac{1}{M} \sum_{i=1}^M |C_i - C_i^{GT}|$$

<Figure size 720x576 with 0 Axes>

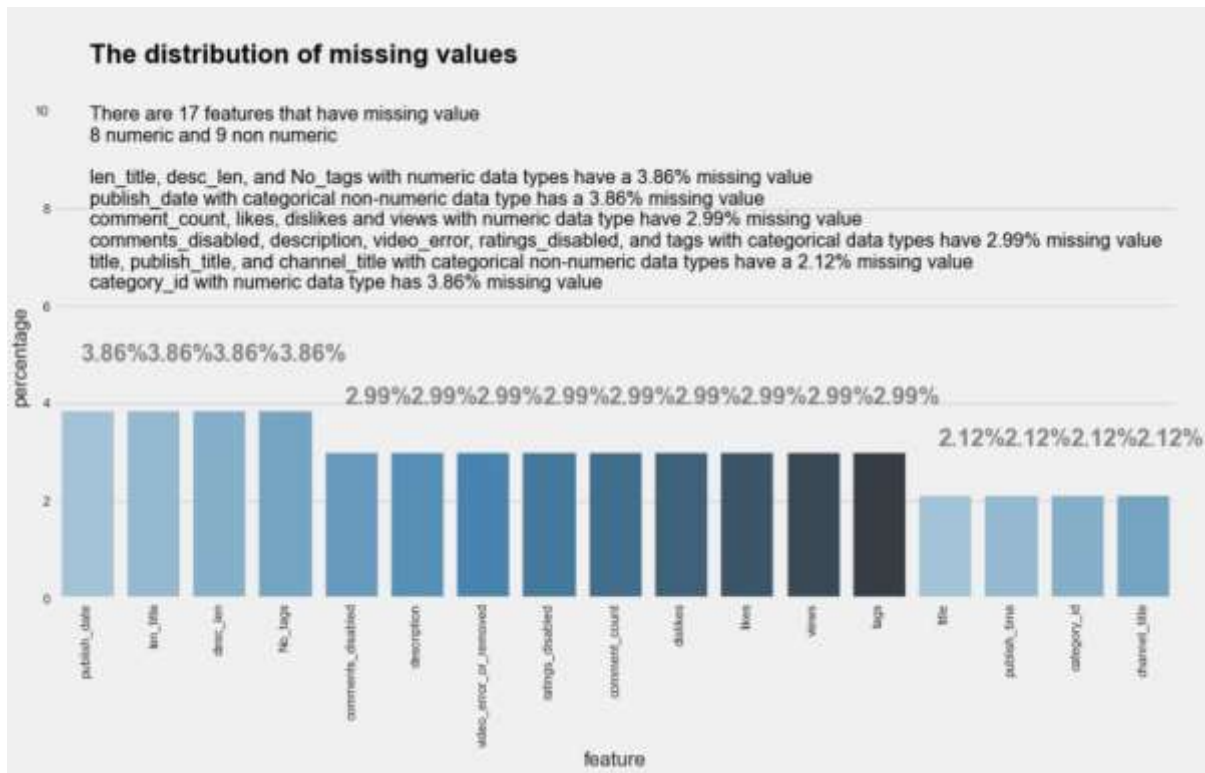


## 1.pairplot chart from any numeric data

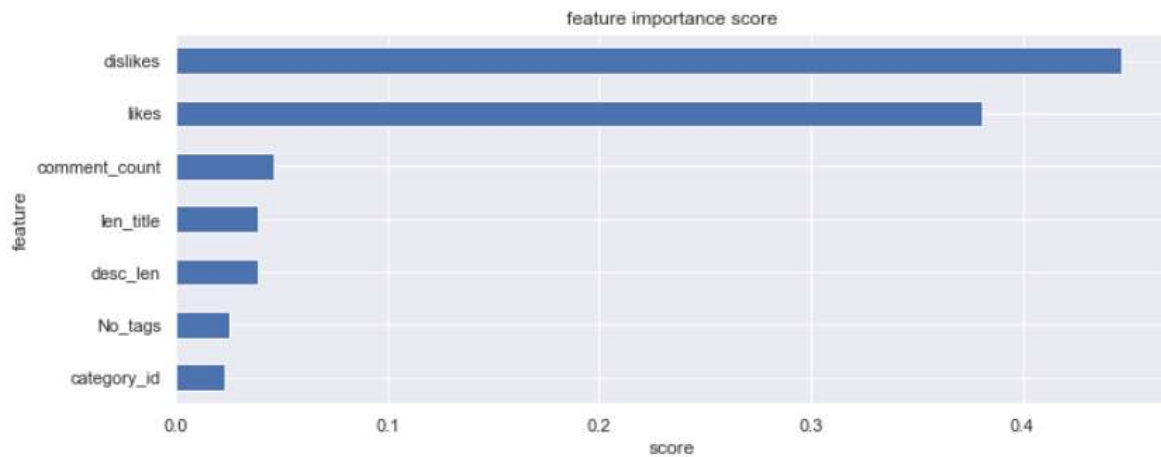




## 2. View data distribution



## 3. The distribution of missing values using the barplot



## 4. Feature importance

### 3. Conclusion

This paper focuses on the analysis of YouTube data and prediction of YouTube views by considering the tags for a particular video and also classifying the category of a video . Random forest regressor was used for the YouTube views prediction. By analyzing this YouTube data, content creators can get to know the right time at which they can upload the video and also likewise they can get more inferences from the analysis we have made so that would be helpful for them in order to grow their channel.

The model we chose has very little tendency to overfitting, but we think it can be tolerated within normal reasonable limits, where the train accuracy has a value of 99,38% and the test accuracy has a value of 96,26%. Based on the experiments that have been carried out, there are several models that are good for determining the views of Youtube videos 1. Random Forest with MAE 0.00, RMSE 0.01, and R2 of 0.96 makes Random Forest the best model so far 2. Decision Tree is the second best sequence model after Random Forest with a slightly smaller R2 value of 0.92 3. Elastic Net is the third best model with MAE 0.01, RMSE 0.01, and R2 0.80 values 4. Ridge Regularization is the next best model with MAE values of 0.01, RMSE 0.01, and R2 of 0.79 5. a very influential feature is the number of likes and dislikes of a video

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# Service Quality & its Impact on Citizen Service Satisfaction: With Reference to Government of Karnataka's Right to Service Act –Sakala

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**Abstract-** *Good Governance is essential for socio-economic sustainability. Delivery of government/citizen services to citizens is the main functionality of any government. For measuring the success of government and their governance well-structured theory is necessary which could assist governments to improve their services and identify the factors which could enhance service quality and satisfaction. This research weighs government's success as measurement of citizen service satisfaction and also explores the relationship between service satisfaction and government's service quality. A model has been proposed and hypotheses have been formulated to test the proposed model. For purpose of empirical estimation, the data utilized for survey was collected from the state of Karnataka, India. The Government of Karnataka delivers services to citizens through 'Right to Service Act'. This act ensures in-time delivery of notified services to citizens and known as 'The Karnataka Sakala Services Act, 2011 and (Amendment) Act, 2014'. This act was implemented on April 2<sup>nd</sup> 2012 across the state and currently there are 99 Government institutions delivering 1115 services through this act which is also popularly known as 'Sakala'. A survey was conducted and 1027 valid responses were received. Functional quality and technical quality were considered as service quality dimension and these dimensions were contributed by the factors. The factors Tangibility, Reliability, Responsiveness, Assurance and Empathy contributing to functional quality whereas, the factors Valence and Waiting Time contributing to technical quality.*

**Keywords** Right to Service, Sakala, Citizen Charter, Stipulated time, e-Governance, in- time service, Government Service, Citizen Service

## 1. Introduction

Transparency, Accountability and responsiveness of the administration are the three crucial aspects of good governance. Efficient and prompt service delivery has always been a matter of concern for Governments. Citizens who are entitled to avail hassle free & timely public service have to face a lot of problems and obstructions to receive the needy service mainly because of the bureaucratic apathy, red-tapism & unjustified delays. 'Right to Service Act' is a response to the quest for solving problems which citizens face day-in & day-out while availing the services from Government institutions. The act enshrines the trust between the Government's service providing institution/department and the service availing citizens. The concept of 'Right to Service' was first articulated through Citizen's Charter in United Kingdom in the year 1991 with a national programme to gradually improve the quality of public services delivered by the government organizations and institutions. The charter focused on 6 principles, which included improving the quality of public service delivery system, Setting up standards in service delivery in-terms of what to expect and how to approach when an government organization fails to meet the standards, introduction of choices and alternatives wherever possible in the service work flow, valuing the tax payers money, accountability of officials and government organizations, Transparency in handling government rules, procedures, schemes and grievances. The objective of citizen's charter was to strengthen the position of citizens while availing the public services. In the year 1981 the same program was re-launched with name

“Services-First”, with a focus to deliver public services which align to the needs of the citizens. The Service first followed nine principles in United Kingdom – Setting up service delivery standards, Government encouraged openness and delivery of full information associated with services, encouraged consultation and involvement of citizens, ease of access, fair treatment to all individuals, setting things right when they go wrong, effective utilization of resources, innovative and improved service delivery and work in synchronization with other service providers.

In India the Citizen’s Charter was structured with similar principles of that of United Kingdom. The process began with the inclusion of sectors which had greater public interfaces. The Charter were expected to include, service delivery standards, stipulated time for delivery of these services, and grievance redressal models. The instructions/guidelines for structuring the charter were provided by Department of Administrative Reforms and Public Grievances, India. The country legislated Citizen’s rights & in the year 2005 the country passed a Right to Information Act and also declared right to food, education, housing among others. The state of Madhya Pradesh was the first state government to implement “Right to Service Act in India”. The states of Bihar, Delhi, Punjab, Karnataka followed by other states gradually started to pass the ‘Right to Service’ bill. Till the first half of 2022 ‘Right to Service Act’ has been adapted by 24 states and 5 union territories. The state of Karnataka has been delivering the greatest number of services in India-1,115 under this act at in-time disposition rate of 95.06%. As on 30-06-2022 the state has received over 276,063,319 service request applications and disposed 274,311,533 applications.

This research shall access quality of service delivered by the government and the service satisfaction achieved by citizens by availing services under this act in Karnataka. And based on the survey inputs a model shall be developed to understand the relation between quality of service delivered and its impact on service satisfaction.

## **2. Review of literature on service quality & satisfaction**

The foundation to understand, measure and improve service quality was laid by the research and study conducted by Shostack (1982, 1984), Gronroos (1984) & Parasuraman et al. (1985). Perceived service quality model (Gronroos 1984,1990) and SERVQUAL (Parasuraman et al., 1985) were the two models to gain maximum attention among the research scholars. It has been suggested that ‘perceived service quality model’ replaces the product feature of physical product during consumption of services (Gronroos, 1988). Further two service quality dimensions have been identified by Gronroos, which include the functional aspect involving “how” service has been delivered and technical aspect “what” service has been provided. Consumers perceive what they receive as process outcome of service delivery in which resources have been utilized i.e. technical/outcome quality dimension of the service delivery process. At the same time consumers also perceive how the process itself functions, i.e functional or process quality dimension. For some services like that of health care it would be difficult for patient/consumer to evaluate technical dimension of service quality as immediate results of a treatment. Lacking ability to access technical quality consumers rely upon functional dimension of service quality “how’s” of health care service delivery system. The functional factors like reliability and empathy would be handy under such circumstances.

Service quality is based on multiple dimensions (Gronroos, 1984, 1990; Parasuraman et al., 1985), also there is no consistency in agreement to nature and content of these dimensions (Cronin & Brady, 2001). European scholars have exerted greater influence on study of dimensions of service quality. Service quality has been defined in-terms of interactive quality, physical quality and corporate (image) quality (Lehtinen & Lehtinen, 1982). Interactive quality relates to interactive nature or two-way flow of interactions involved with service whereas, physical quality relates to tangible aspects of service delivery and corporate quality is about image attribute of service provided by its current as well as potential customers. It has also been suggested that image quality is tended to be more stable with time.

The major focus on functional quality is the main criticism of SERVQUAL model (Baker & Lamb, 1993). The dimensions of service quality were synthesized by illustrating the research work on service quality dimensions by Gronroos (1984) and Lehtinen (1982). The important contribution was identification of service quality based on literature study and categorizing then to “what” – service evaluation post its delivery and “how” – evaluation of service during the delivery process. The research work of Swartz (2003) does not reflect the work of Gronroos. Recent conceptualization of service quality has been proposed by Rust and Oliver (1994). The model was a 3-dimensional model which emphasizes on consumer’s evaluation of 3 dimensions of the service encounter: a) Customer employee interaction (function quality); b) Service environment and c) outcome (technical quality). The research suggests that service environment affects the perception about service quality (Spangenberg et al., 1996). However, it is not easy to distinguish the notion of service environment from functional quality which has been suggested in the literature. Brady & Cronin (2001) had proposed 4 factors comprising the service environment, facility design, ambient condition and social factors. The explanation stated by Brady & Cronin (2001) tells that service environments are actually the elements of the service delivery system. To summarize it seems favorable to include the elements of service-environment as components of functional dimensions.

Technical quality attributes are least explored (Wilkins et al., 2007; Wu & Ko, 2013; Yu & Ramanathan, 2012). The literature suggests that most of the researcher scholars have ignored technical dimension of service quality (Ladhari, 2012; Tamwatin et al., 2016). However, a few scholars have conducted qualitative studies to develop the factors of technical quality (Brady & Cronin, 2001; Ladhari, 2012). For instance, Powpaka (1996) conducted in-depth study to analyze pertinent dimensions of technical quality followed by open-ended surveys conducted by Brady and Cronin (2001). Wu and Ko (2013) proposed three dimensions of technical/outcome quality which are presented as follows: a) Sociability: It refers to the number, type and behavior of the people within the service- setting. b) Valence: It refers to customers’ post-consumption assessments of whether the service outcome is acceptable or unacceptable. c)Waiting time: It refers to the amount of time that customers spend waiting to be served.

There have been various studies carried out either by supporting or challenging the existing models or by adding new knowledge to the existing repository. The importance of e- Governance in upholding government’s accountability & transparency has been vital and a system of rewards has been put in place in most of the states of India (Chandra & Malaya, 2011). Government of India's interoperability to uphold citizen centric service delivery system has been commendable. The integration of Enterprise architecture concept with technology in e-Governance has been well planned (Paul & Paul, 2012). Digitizing government services by redefining, restructuring outdated service delivery process with the help of information & communication technology to provide more citizen centric service delivery system is necessary and government process re-engineering has been the key (Shwetha & Muralidhar, 2018). e-Governance has three main contributors which include e- administration, e-citizens, e-services and e-society. Services must be aligned with hanging needs of citizens and stake holders to develop the economy of the country (Wang & Hou, 2010). Effective implementation of e-Governance services in India considering the poverty, awareness, literacy, basic infrastructure, bandwidth, multilingual and cultural issues has been challenging (Gupta & Bansal, 2013). Availability of information remains key in good governance, which can be achieved only through good co-ordination between sub departments (Singh & Bhatia, 2016). Whenever a feedback survey is done to measure satisfaction, it has been found that respondents give replies on the spur of the moment and not always right. To ensure correctness of the feedback and also the consistency in the replies of the respondents, similar questions have been posed to the respondents in different presentation to get most reliable answer, to obtain accurate satisfaction response variables of Diener(1985) scale have also been studied.

Very few studies have been carried out related to Government service delivery in developing countries

like India and the studies which have been conducted have focused on government perspective rather than the citizen perspective (Lee et al, 2011). Therefore, there is a need to carry out greater number of research and bring about reform in government's citizen service delivery system by examining the exiting models and developing new models to address the government service delivery challenges faced by the developing countries across the globe.

### **3. An overview of Government service delivery in the state of Karnataka**

The word Sakala is derived from Kannada language which means 'Good time' or 'in- time'. The core of the Karnataka's right to service act has been captured as- "The services notified under the act shall be disposed within the stipulated time frame. In case of default the applicant is empowered to raise an appeal and obtain compensation for the delay. The paid compensation is recovered from the salary of the defaulting designated-officer, in instances where it is proved. The compensation for delay is fixed as Indian Rs. 20/ day upto a threshold of Rs.500/.

Government has provided multiple platforms to avail these services – there are more than 543 online services in Sakala which can be applied through government's online platform known as Sevasindhu. Applicant can physically go the designated office and apply for the service or visit various government authorized service delivery centres and raise service application. Government has also facilitated home delivery of citizen services through its initiative known as 'Janasevaka', which is available in selected locations. Applicant must make a phone call to government's helpline number and book a slot, the government's representative known as 'Janasevaka' will visit the applicant's house, receive the documents by providing acknowledgment and within the stipulated time deliver the service certificate to the applicant. It is duty of the applicants to provide their cell phone numbers at time of registration for government/citizen services, by doing so applicant shall be intimidated about the interim status of their service request through an automated process. The system is so sophisticated that every time a service request is made a 15-digit unique acknowledgement number gets generated. This number is popularly known as GSC (Guarantee of Services to Citizen) number/Sakala number. This GSC number helps applicant to track status of their service application either by visiting the Sakala website and entering the GSC at provided text fields or by calling the helpline number. Applicant can directly track the reason for delay and rejection. If approved, applicant can either download or receive the service certificate manually. The Sakala online has self-registered cell-phone numbers of all the 31,496 designated officers of government departments respectively and the system automatically send, the service due for disposal reminders on twice a day basis to the cell-phone numbers of designated officers. Hence ensuring smooth flow of service delivery process(Figure:1).

### **4. Research methodology & Data analysis**

A survey was conducted to evaluate the service-satisfaction among citizens who had applied for service through Sakala. As many as 30 variables and 27 of these were included in a survey instrument in order to access the quality of service delivered. These variables were developed and categorized under 7 factors based on various literature review outcome. These 7 factors were categorized under two dimensions functional quality and technical quality which influenced the quality of service delivered to citizens. The gauge the service satisfaction 3 more variables were included. Focus interview was carried out with public servants involved in service delivery process. A 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used for rating service quality variables. The details of 7 factors and 27 variables mapped to them are provided below followed by 3 variables mapped for citizen service satisfaction(Table D).

#### **4.1 Hypothesis Development**

Based on research framework, a total of 12 hypothesis were formulated, of which 5 are major hypotheses

and 6 are minor hypotheses.

- 5 major hypothesis associates:

I. Citizen service satisfaction with service quality

II. Citizen service satisfaction with different dimensions of service quality

III. Service quality with different dimensions of service quality

- 7 minor hypotheses associate the dimensions of service quality & its factors.

IV. Functional Quality & Factors of functional quality

4.1.1 Major Hypotheses

The major hypotheses associate with major dependent variables such as citizen service satisfaction, service quality, its constituent dimensions. These help in assessing the impact of service quality on citizen service satisfaction, impact of different dimensions of service quality on citizen service satisfaction & impact of different dimensions of service quality on service quality of Government of Karnataka's right to service act.

I. Citizen service satisfaction & service quality of Government of Karnataka's right to service act

H1: The service satisfaction of citizens with respect to Government of Karnataka's right to service act is positively associated with quality of services experienced by the citizens/applicants.

II. Citizen service satisfaction & Dimensions of service quality of Government of Karnataka's right to service act

H2: Service satisfaction of citizens with respect to Government of Karnataka's right to service act is positively associated with functional quality experienced by citizens/applicants.

H3: Service Satisfaction of citizens with respect to Government of Karnataka's right to service act is positively associated with technical quality experienced by the citizens/applicants.

III. Dimensions of service quality & service quality of Government of Karnataka's right to service act

H4: The functional quality of services of Government of Karnataka's right to service act is positively associated with quality of services experienced by citizens/applicants.

H5: The technical quality of Government of Karnataka's right to service act is positively associated with quality of services experienced by citizens/applicants.

4.1.2 Minor Hypotheses

Minor hypotheses are associated with various dimensions of service quality & its factors. Minor hypotheses help in examining the factors which constitute dimensions of service quality of Government of Karnataka's right to service act. These minor hypotheses include 5 hypothesis associating functional quality with tangibles, reliability, responsiveness, assurance & empathy, two hypotheses associating with information quality.

IV. Functional Quality & Factors of functional quality

H6: The functional quality of services of Government of Karnataka's right to service act is positively associated with tangibles factor of Government of Karnataka's right to service act experienced by citizens/applicants.

H7: The functional quality of services of Government of Karnataka's right to service act is positively associated with reliability factor of Government of Karnataka's right to service act experienced by citizens/applicants.

H8: The functional quality of services of Government of Karnataka's right to service act is positively associated with responsiveness factor of Government of Karnataka's right to service act experienced by citizens/applicants.

H9: The functional quality of services of Government of Karnataka's right to service act is positively associated with assurance factor of Government of Karnataka's right to service act experienced by citizens/applicants.

H10: The functional quality of services of Government of Karnataka's right to service act is positively associated with empathy factor of Government of Karnataka's right to service act experienced by citizens/applicants.

#### V. Technical Quality and Factors of Technical Quality

H11: The technical quality of services of Government of Karnataka's right to service act is positively associated with Valence factor of Government of Karnataka's right to service act experienced by citizens/applicants.

H12: The technical quality of services of Government of Karnataka's right to service act is positively associated with Waiting time factor of Government of Karnataka's right to service act experienced by citizens/applicants.

#### 4.2 Data Collection

The sample population were citizens who had applied/availed for citizen services through Sakala. To ensure credibility of response received, the respondents were requested to share their unique 15-digit GSC number which they had received while raising application through Sakala. Sheets were circulated through digital medium as well as phone calls were made to applicants who had applied/availed for the citizen services through Sakala and response was collected. The valid sample size obtained was of 1027. As we had selected top 5 services for this survey it was ensured that at-least 200 survey response was collected for each mentioned service respectively. Respondents who had applied for below mentioned 5 services were approached.

a) 'All types of caste certificate' service provided by Revenue department which received 7,678,820 service applications (receipts from Jan 2019 to August 2021). The stipulated time notified to avail this service is 21 working days.

b) 'Registration of land/Property' service provided by department Inspector General of Registration & Stamps which received 5,160,745 service applications (receipts from Jan 2019 to Aug 2021). The stipulated time notified to avail this service is 1 working days.

c) 'Modification in Existing Ration Card' service provided by Food, Civil Supplies, Consumer Affairs & Legal Metrology Department which received 4,132,436 service applications (receipts from Jan 2019 to Aug 2021). The stipulated time notified to avail this service is 7 working days.

d) 'All types of Income Certificate' service provided by Revenue Department which received 3,747,324 service applications (receipts from Jan 2019 to Aug 2021). The stipulated time notified to avail this service is 21 working days.

e) 'Issue of Bus Pass to School Children' service provided by Transport Department which received 2,900,939 service applications (receipts from Jan 2019 to Aug 2021). The stipulated time notified to avail this service is 7 working days.

#### 4.3 Data Analysis

Profile of the Respondents. The respondents included from all over the state of Karnataka. The demographic details of the respondents have been provided below (Table II).



Count of respondents were greater in districts which had larger populations. Exploratory Factor Analysis and Cronbach's Alpha Tests were carried to test the reliability as well as consistency of variables. The results are as follows (Table:III).

Factor analysis has been used to construct the factors which contribute to the dimensions of service quality of Government of Karnataka's right to service act as perceived by the citizens availing the service from Government of Karnataka. Kaiser- Meyer-Olkin measure of sampling-adequacy & Bartlett's test of sphericity are the two tests which were used to determine applicability of factor analysis to determine factors. It was found that value of Bartlett's test of sphericity is significant ( $p < 0.001$ ,  $p = 0.000$ ). Also, it is observed from the table III that Kaiser-Meyer-Olkin measure ranges from 0.751 to 0.908, which is greater than the minimum suggested.

Communalities indicate the amount of variance in each variable which is being defined by the factors. Communalities are essentially an extension of factor loadings. The communality of a variable is the sum of the loadings of a particular variable on all other extracted factors. Greater value of communality of a variable indicates that specific variable is adequately reflected through extracted factors. This proves reliability of factor analysis.

Component matrix value squared for an item gives the value of communalities for that item or variable. For item under tangibility 'VAR01' component matrix value is of .908 when squared (regression r-square is correlation square, indicating the amount of variance that was accounted for, which indicates 82.5% of variance in item 1 is explained by factor 1 or tangibility we retained) it comes to .825 which is the value of communalities for same item. Similarly, relationship holds good for all the other variables stated under their respective factors. From the table III it is clear that communalities are higher than 0.6 for all variables included, this ensures that variables are adequately being reflected by the extracted factors.

From the table III, Cronbach's alpha value for tangibility is ".920". Therefore, we have a very high reliability, this is only possible when we are using a highly tested scale. To verify this result we can refer the column "Cronbach's Alpha if item deleted" which will tell us that what will be the impact on Cronbach's Alpha value if any one of the defined parameters are deleted. The results indicate that if any one of the 4 parameters are deleted than the "Cronbach's Alpha" would be reduced to a value lesser than the existing value. This indicates that our scale wouldn't be helped out if any one of these parameters under tangibility is deleted. Further strengthening the parameters which we had selected for "Tangibility". Similarly, the explanation holds good for all the other factors and their respective variables.

Table III exhibits the total variance explained for all factors which affect the dimensions of service quality of Government of Karnataka's right of service act. 7 factors were extracted and their Eigen values have been greater than 1. When these factors were extracted, it was observed that 77.201% to 89.446% of the variance would be explained.

With regard to factor loadings, it is known that contribution of variables in defining particular factor is dependent on co-relation coefficients, also called as loadings. Greater the loading value, greater will be the contribution of variable in defining a factor. From table III it is evident that all factor loadings are very high ranging from

.858 to .949. Therefore, the variables could define their respective factors.

From table III, 7 factors were positively formed using factor analysis and identified as the factors affecting dimensions of functional quality and information quality which together contribute to service quality of Government of Karnataka's right to service act, in turn affecting the citizen service satisfaction.

#### 4.4 Hypothesis Testing

Pearson's correlation coefficient which measures the strength of association between two variables is used to test postulated hypotheses in this research. The hypotheses in this research proposed association of:

- Citizen Service Satisfaction with service quality & various dimensions of service quality.

- Service quality with various dimensions of service quality, that is functional quality and technical quality.
- Dimensions of service quality with the respective factors.

#### 4.4.1 Citizen Service Satisfaction & Service Quality

Through Pearson Correlation it has been found that Pearson correlation coefficient between Citizen service satisfaction & service quality is high/significant ( $r = .743^{**}$ ) and hence the hypotheses H1 is accepted. The table also represents that there is an association between citizen service satisfaction and various dimensions of service quality that are functional quality ( $r = .739^{**}$ ), technical quality ( $r = .733^{**}$ ). Hence the Hypothesis H2 and H3 are also accepted.

However, it has been noted that association of service quality on citizen service satisfaction is strong, among the dimensions of service quality technical quality has a higher (significant) association with citizen service satisfaction, while the association of functional quality on customer satisfaction is slightly lesser.

#### 4.4.2 Service Quality and its Dimensions

With respect to correlation between service quality and the different dimensions of service quality, as represented in table 39, it is observed that there is high correlation –

- $r = 0.990$  between functional quality and service quality
- $r = 0.991$  between technical quality and service quality Hence hypothesis H4 and H5 are accepted.

#### 4.4.3 Functional Quality & Factors

Through Pearson Correlation it has been found that, the Pearson correlation coefficient between functional quality and the factors which constitute functional quality, that are: Tangibility, Reliability, Responsiveness, Assurance and Empathy are high (significant).

The association of functional quality on tangibility, reliability, responsiveness, assurance and empathy are very high (significant) and respectively “r” values are .954, .965, .955, .957, and .969 respectively and hence hypotheses H6, H7, H8, H9 and H10 are accepted.

#### 4.4.4 Technical Quality & Factors

Through Pearson Correlation it has been found that the Pearson correlation between technical quality & the factors which constitute information quality, which are Valence and Waiting Time are very high (significant) and “r” values have been .975 and .977 and hence Hypotheses H11 and H12 are accepted.

#### 4.5 Summary of Hypotheses Testing (Table: IV)

#### 4.6 Regression Analysis

Regression analysis assists in predicting relationship between “dependable variables” and one or more “independent variables”. The outcome is represented by the dependent variable, while inputs/predictors are represented by the independent variables. Here the dependent variable is ‘Citizen Service Satisfaction’, whereas independent variables are ‘service quality’ which constitute functional quality as well as technical quality. Therefore, regression analysis is carried out with citizen service satisfaction on service quality and citizen service satisfaction on functional quality and technical quality. The results are provided below:

##### 4.6.1 Citizen Service Satisfaction on Service Quality

On conducting regression analysis to analyse impact of service quality on citizen service satisfaction, as represented in table V, it has been found that 74.3% association is existing between service quality and

citizen service satisfaction. Also, it has been found that 55.2% of variation in citizen service satisfaction is captured by service quality.

Regression model is significant, which indicates that citizen service satisfaction can be expressed as proportional change in service quality.

Therefore,  $CSS = \beta * SQ$

CSS -> Citizen Service Satisfaction SQ -> Service Quality

Constant value was insignificant & hence has been removed from the developed model. B coefficient corresponding to table V is 0.743, this indicates that for every unit change in service quality, there shall be a corresponding change of 0.743 units in Citizen Service Satisfaction. It has been found that model is significant.

#### 4.6.2 Citizen Service Satisfaction on Functional Quality & Technical Quality

On conducting regression analysis to assess the impact of functional quality and information quality on citizen service satisfaction as represented in table VI, it is found that 74.4% association exists between functional quality and technical quality on Citizen service satisfaction. Also, it has been found that 55.2% of variation in citizen service satisfaction is captured by functional quality and technical quality.

Regression model is significant and indicates that citizen service satisfaction can be expressed as proportional change in functional quality and technical quality.

Therefore,  $CSS = \beta_1 \times FQ + \beta_2 \times TQ$  CSS -> Citizen Service Satisfaction FQ -> Functional Quality

TQ -> Technical Quality

The constant was insignificant hence removed from existing model. From table VI, it can be noted that the  $\beta$  coefficient corresponding to functional quality is equal to .457, this indicates that for every unit change in functional quality there will be a corresponding change of 0.457 units in citizen service satisfaction. It can also be noted that  $\beta$  coefficient corresponding to technical quality is equal to 0.294, this indicates that for every unit change in technical quality there will be a corresponding change of 0.294 units in citizen service satisfaction. Hence, we infer that contribution of functional quality and technical quality are significant to citizen service satisfaction. However, functional quality has a greater impact on citizen service satisfaction when compared with impact of technical quality (Figure2: Structural Model).

### Discussion and Conclusion

From the research mean and standard deviation values it is evident that a larger part of the applicants are satisfied with the quality of service provided by the government. The functional quality had 5 factors and among these 5 factors, 'Responsiveness' has been the factor which explains 82.555% of the variance and has maximum impact on Government's Right to service delivery system as justified in table IV. The service delivery helpline number has been effective in assisting applicants at various stages of service delivery and Government's citizen query resolving online platform has helped many citizens to resolve their queries associated with service delivery system. The willingness of the officials and query resolving system of the government involved in service delivery has been effective in providing prompt service to the citizens. "Responsiveness" has also been found to be crucial indicator of service quality in a research study conducted by Griffith & Krampf (1998).

The next factor which has greater impact on functional quality has been Assurance. The factor

explains 82.385% of the variance. The government initiatives like home delivery of Government services within stipulated time, online system to apply and download the services, quick assistance through email communication has assured citizens of receiving the service within stipulated time and hence this factor has received second most importance as it talks about inspiring trust and confidence among the citizens.

Tangibility has been the third impactful factor, which explains 80.677% of the variance. The display of standardized workflow, information exhibiting display boards on office premises and visual notifications received by applicants related to status of their application on their handheld devices have been effective in helping applicants to track and know the status of their service applications, which further promotes transparency in service delivery system of the government.

Fourth impactful factor influencing functional quality has been Reliability, which explains 79.951% of the variance. The whole 'Right to Service Act' speaks about delivering the services in promised time by the government to its citizens and the statistics prove that Government of Karnataka has been successful in doing so through its in-time disposition rate of 95.06%. This clearly proves that the service delivery system has been accurate as well as dependable and hence citizens feel the Government's service delivery system is reliable. The finding of this study is in track with study conducted by Wolfenbarger and Gilly, 2003 who defined reliability as prominent predictor of service satisfaction, quality & also a predictor of loyalty among customers to reutilize/reapply the service.

The fifth factor to influence functional quality of service delivery has been Empathy which explains 77.201 of the variance. Government of Karnataka's citizen friendly initiatives like 'Citizen Happiness Index' – Where government makes a feedback call to citizen with help of call centre executives and asks citizen to rate the service received by them has been one of the most unique and first of its kind initiatives of Government in India where Government actually reaches the citizen to know about the quality of service received by them. 'Sakala Mitra' (The word Mitra in kannada as well as hindi language means friend)– this is the initiative of Government of Karnataka where volunteers assigned by the government create awareness about government's service- related initiatives through door-to-door campaigns. Through this initiative Government is also conducting citizen requirement survey to access the needs of the citizens. These initiatives of government have been successful to provide individual attention to its citizens requirement and needs.

The above mentioned five factors of functional quality help us to understand that government of Karnataka has been successful in implementation of Right to Service Act within the state and also inspire trust and confidence among its citizens.

The second dimension influencing service quality has been technical quality which is largely influenced by two factors valence and waiting time.

The factor 'Waiting Time' had a greater impact on technical quality. The factor explains 83.865% of the variance. The main purpose of "Right to Service Act" has been in-time delivery of services to its citizens. Sakala has ensured that citizens are receiving services in-time through providing exclusive timelines to each of its services and introduction of digitization in service delivery process has further assured that these services reach citizen at quicker phase. Sakala has also been flexible in amending the timelines for services with assistance of Government process re-engineering of these services. All these initiatives assure that the waiting time of service delivery is reduced with advancement of technology.

Valence is post consumption assessment of service delivery which influences technical quality. Valence explains 78.253% of the variance. The Right to service act has been exclusive "for the people" initiative by the Government. The pre-defined time line and mechanism to file appeal in

case of defaults through self-raised appeal system has ensured that citizens get justification for disposal of their applications. The measures under this act have standardized the workflow for service delivery and introduced transparency to certain extent in the service delivery system as a result more than 260,760,543 citizens have been benefited by receiving their services within promised stipulated time by the government.

All these results highlight that government has been able to achieve greater service satisfaction among its citizens by enhancing the quality-of-service delivery. The efforts of Government of Karnataka in enhancing the quality of services delivered have been remarkable and citizen friendly. The initiatives of Government of Karnataka under Sakala- Right to Service Act are benchmark for other governments delivering services under “Right to Service Act”, Citizen Charter or any such acts or initiatives.

### *Challenges faced by Government and further scope for research*

From the year 2017 the Government of Karnataka has shifted its focus towards digitization of services through its e-Governance initiatives. Digitization has had its advantages as well as disadvantages. The main advantage is of faceless and cashless delivery of services to citizens. Citizens can apply from the place of their comfort through their handheld or desktop devices for these services. The digitization has also caused an alarming trend in rejection of applications. Prior to year 2017 the states average cumulative rejection rate was 5.77% (considering 2012-2016 data). However, since digitization the average rejection rate has increased to 8.52% (considering 2017- 2021 data), it has been found that larger part of increase in the rejection rate is due to incomplete or unclear documents uploaded by applicants while applying for these online services. Hence IT literacy plays a crucial role in such cases. The use of sophisticated technological equipment's, scanners, printers, monitors especially in some parts of rural Karnataka is directly proportional to IT literacy in those areas. With Government planning to increase the number of end-to-end online services, introduction of self-help Kiosks to enhance the user experience of availing services, IT literacy would play a crucial part in success of these initiatives and this shall be major scope for research scholars as we move forward.

This study is of paramount importance to personnel associated with government service delivery system as this study assists officials in understanding the common perception of citizens in defining factors influencing the service quality as well as its impact on achieved service satisfaction. The results obtained from this research will be beacon for officials of Government, future research scholars to understand the importance of Government's service delivery system and factors which contribute in enhancing the quality of service delivered to citizens.

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Tables

S.N	Independent variables which constitute factors	Factors which contribute to dimensions of service quality	Dimensions Constituting Service Quality	Influencing
VAR01	Standardized Work flow - defined for every sakala notified service by the government	<b>Tangibility</b> - Visual appearance and Physical facilities (Parasuraman et al., 1985)	Functional Quality	Service Quality
VAR02	Display Boards exhibited in designated offices of Government			
VAR03	Visual Service Notification – status updates received on mobile phones			
VAR04	Service Status Tracking – Web based service (Visual Appeal)			
VAR05	Accuracy at which service is approved	<b>Reliability-</b> Perform promised service accurately and dependably (Parasuraman et al., 1985)		
VAR06	Accuracy at which service delivered			
VAR07	Service delivery is reliable under Sakala			
VAR08	Service delivery under Sakala instils confidence			

VAR09	Quality of Service delivered under Sakala was able to meet the in-time needs	<b>Responsiveness-</b> Willingness to help, assist and provide prompt service (Parasuraman et al., 1985)		
VAR10	Assistance received while availing the service			
VAR11	Designated officers/officials' willingness to support while availing the service			
VAR12	Public servants/representatives treated you Chivalrously	<b>Assurance-</b> Courtesy of employees, knowledge and ability to inspire trust and confidence. (Parasuraman et al., 1985)		
VAR13	Did you feel safe while doing transaction through Government's service delivery system			
VAR14	Quality of information communicated by the department while availing service			
<b>S.N</b>	<b>Independent variables which constitute factors</b>	<b>Factors which contribute to dimensions of service quality</b>	<b>Dimensions Constituting Service Quality</b>	<b>Influencing</b>
VAR15	Government's ability to resolve the service-related queries	<b>Empathy-</b> Individualized attention provided by firm to customers and care. (Parasuraman et al., 1985)		
VAR16	Assistance received while availing service			
VAR17	Sakala delivers services which meet citizen requirements			
VAR18	Sakala understands citizen specific needs			
VAR19	Sakala values interest of citizens			
VAR20	Rate the experience of availing service through Sakala	<b>Valence -</b> It refers to post consumption	Technical Quality	
VAR21	Provide rating for department involved in service delivery			



VAR22	Provide rating to public servant/representative who disposed or involved in disposal of your service application	assessments of whether the service outcome is acceptable or unacceptable. (Wu& Ko,2013)  <b>Waiting Time</b> – It refers to the amount of time that customer spend waiting to be served. (Wu& Ko,2013)		
VAR23	Promptness of delivered service			
VAR24	Your willingness to re-apply for services through Sakala			
VAR25	Was the service disposed in promised time			
VAR26	Accuracy of Sakala in claiming to be a in-time service delivering entity			
VAR27	Rate Sakala as a dependable service delivering system			
S.N	<b>Independent variables which constitute factors</b>			
VAR28	Sakala is Excellent Service delivery system	<b>Citizen Service Satisfaction</b> (Diener,1985)		
VAR29	I am Satisfied with Service delivery system notified under Sakala			
VAR30	I Shall Continue to receive service through Sakala and change almost nothing in existing service delivery process			

**Table I:** Details of variables and factors

District Name	Respondents Percentage distribution wise	District Name	Respondents Percentage distribution wise
Bengaluru Urban	26.87%	Chikkamagaluru	1.36%
Mysuru	11.00%	Koppal	1.36%
Dakshina Kannada	9.93%	Tumakuru	1.27%
Belagavi	9.06%	Raichur	1.17%
Bengaluru Rural	5.74%	Uttara Kannada	1.17%
Vijayapura	3.51%	Chitradurga	0.88%
Bidar	3.41%	Kalaburagi	0.88%
Yadgir	3.12%	Kolar	0.88%

Hassan	3.02%	Shivamogga	0.88%
Chamarajanagar	2.73%	Ballari	0.78%
Mandya	2.34%	Kodagu	0.78%
Haveri	1.95%	Davanagere	0.39%
Bagalkot	1.75%	Udupi	0.29%
Dharwad	1.75%	<b>Total</b>	<b>100%</b>
Gadag	1.75%		

**Table II.** Demographic details of Respondents who participated in the survey

S.N	Factor	KMO Value	Mean	Standard Deviation	Initial	Extraction	Factor Loading	Cronbach's Alpha if Item Deleted	Variance Explained (%)	Cronbach's Alpha
VAR01	Tangibility	.854	3.18	1.112	1.000	.825	.908	.890	80.677	.920
VAR02			3.20	1.091	1.000	.787	.887	.902		
VAR03			3.22	1.110	1.000	.806	.898	.896		
VAR04			3.33	1.174	1.000	.809	.900	.896		
VAR05	Reliability	.856	3.20	1.107	1.000	.799	.894	.892	79.951	.916
VAR06			3.26	1.124	1.000	.802	.895	.891		
VAR07			3.21	1.117	1.000	.786	.887	.896		
VAR08			3.29	1.053	1.000	.811	.901	.888		
VAR09	Responsiveness	.751	3.23	1.092	1.000	.818	.904	.856	82.555	.894
VAR10			3.24	1.088	1.000	.828	.910	.847		
VAR11			3.25	1.098	1.000	.831	.912	.844		
VAR12	Assurance	.751	3.26	1.119	1.000	.819	.905	.852	82.385	.893
VAR13			3.22	1.088	1.000	.824	.908	.848		
VAR14			3.23	1.100	1.000	.829	.910	.843		
VAR15	Empathy	.906	3.21	1.089	1.000	.742	.861	.914	77.201	.926

5										
VAR16			3.26	1.089	1.000	.789	.888	.907		
VAR17			3.19	1.074	1.000	.779	.882	.908		
VAR18			3.25	1.098	1.000	.779	.883	.908		
VAR19			3.26	1.090	1.000	.771	.878	.909		
VAR20	Valence	.908	3.19	1.201	1.000	.803	.896	.911	78.253	.930
VAR21			3.20	1.091	1.000	.772	.878	.916		
VAR22			3.17	1.092	1.000	.768	.876	.917		
S.N	Factor	KMO Value	Mean	Standard Deviation	Initial	Extraction	Factor Loading	Cronbach's Alpha if Item Deleted	Variance Explained (%)	Cronbach's Alpha
VAR23			3.29	1.163	1.000	.804	.897	.911		
VAR24			3.31	1.136	1.000	.766	.875	.917		
VAR25	Waiting Time	.754	3.25	1.203	1.000	.842	.917	.860	83.865	.903
VAR26			3.22	1.131	1.000	.848	.921	.853		
VAR27			3.28	1.118	1.000	.826	.909	.872		
S.N	Factor	KMO Value	Mean	Standard Deviation	Initial	Communalities	Factor Loading	Cronbach's Alpha if Item Deleted	Variance Explained (%)	Cronbach's Alpha
VAR28	Citizen Service	.770	3.19	1.107	1.000	.901	.949	.908	89.446	.940
VAR29	Satisfaction		3.17	1.105	1.000	.901	.949	.906		
VAR30			3.20	1.109	1.000	.881	.938	.925		

**Table III.** Descriptive statistics, communalities and Cronbach’s Alpha values for Tangibility, Reliability, Responsiveness, Assurance, Empathy, Valence, waiting time and service satisfaction

Hypotheses	Association	“r” value	Closeness	Results
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H1	SQ & CSS	.743	High	Accepted
H2	FQ & CSS	.739	High	Accepted
H3	TQ & CSS	.733	High	Accepted
H4	FQ & SQ	.990	Very High	Accepted
H5	TQ & SQ	.991	Very High	Accepted
H6	Tangibility & FQ	.954	Very High	Accepted
H7	Reliability & FQ	.965	Very High	Accepted
H8	Responsiveness & FQ	.955	Very High	Accepted
H9	Assurance & FQ	.957	Very High	Accepted
H10	Empathy & FQ	.969	Very High	Accepted
H11	Valence & TQ	.975	Very High	Accepted
H12	Waiting Time & TQ	.977	Very High	Accepted

CSS – Citizen Service Satisfaction; SQ- Service Quality; FQ- Functional Quality;  
TQ – Technical Quality;

Table IV: Summary of Hypothesis Testing

Correlation Coefficient ( R )	.743
Adjusted RSquare	.552
$\beta$ Coefficient (t value, p value)	.743 (t = 35.552; p <.000)
ANOVA – f value (p value)	1263.910 (p <.001)

Table V: Impact of Service Quality on Citizen Service Satisfaction – Regression Analysis Results

Correlation Coefficient ( R )	.744
Adjusted RSquare	.552
$\beta$ Coefficient (t value, p value)	Functional Quality is .457 (t = 6.082; p = <.001)
	Technical Quality is .294 (t = 3.908; p < .001)
ANOVA – f value (p value)	633.042 (p < 0.001)

Table VI: Impact of Functional Quality and Technical Quality on Citizen Service Satisfaction – Regression Analysis Results

Figures

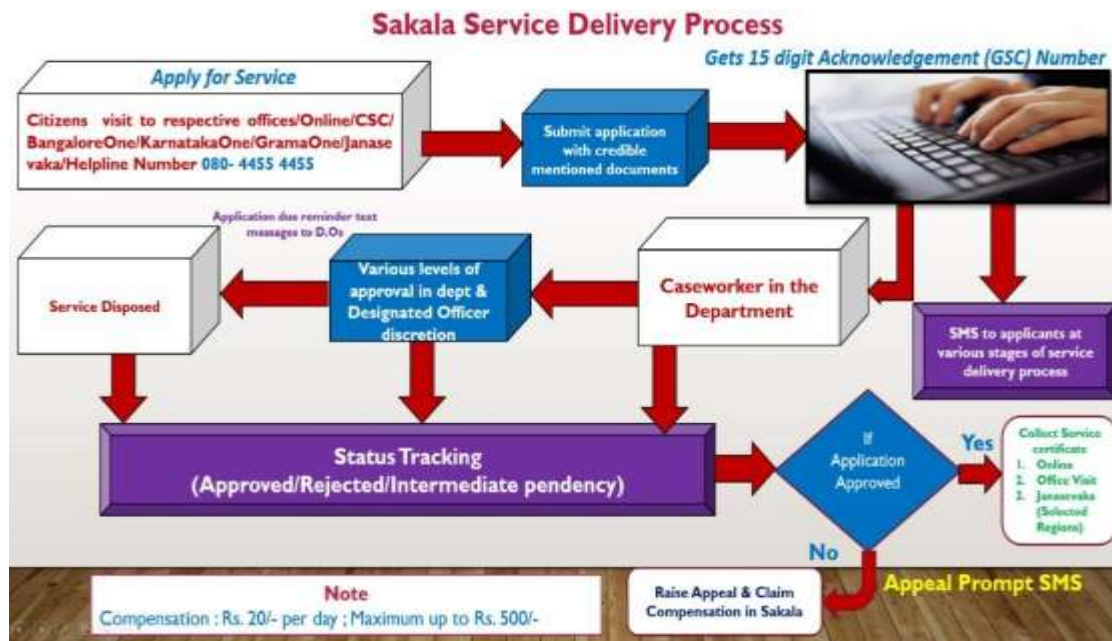


Figure 1: General Workflow associated with Service delivery process in Karnataka’s Right to Service Act

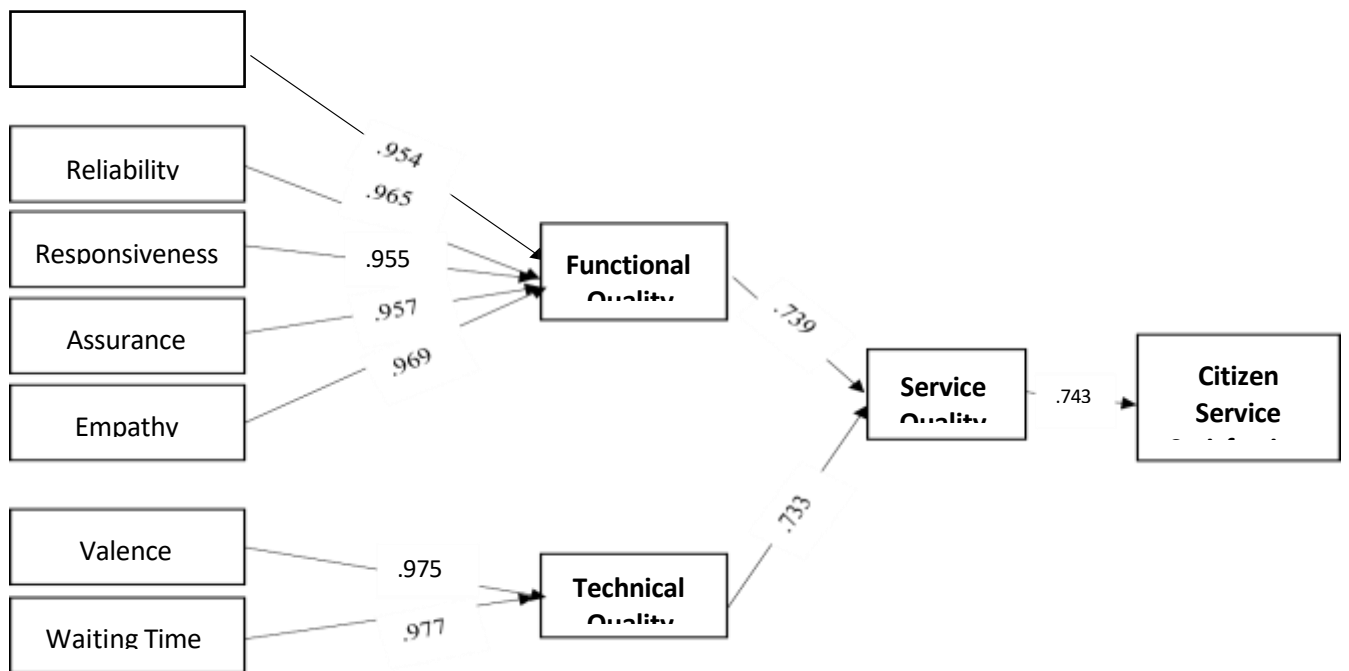


Figure 2: Structural Model

# Wellness of Women in It Sector and Impact on Individual Productivity

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## *Abstract*

*Women in Indian society have always been inequality against and excluded from political, economic, and family matters. Women in India face many serious health or wellness concerns at work or in their families, which leads to an imbalance in the quality of life. The main aim of the study was to assess the different wellness of health among working women in the IT sector during post covid. A descriptive and cross-sectional study was performed. A random sampling method and a total of 446 responded to the study. A conceptual framework was developed for the study. Sociodemographic, physical, emotional, social, spiritual, intellectual, environmental, and financial wellness data were collected. The present study showed that the study respondents' age is less than 30 years, live in Bengaluru urban district, graduated, are married, have a permanent job in middle-level management, and have an income of Rs. 50000–74999, with less than 10 years of work experience, and all are working remotely during the study period. A positive and negative significant relation was found between the age, experience, income, and wellness domains. Factors associated with health problems; the strongest association was found. The pandemic has been particularly difficult on women because the resultant work-life imbalance has led to mental stress, social problems, financial problems, and physical ailments along with an increased number of these issues. Stress, anxiety, depression, and disrupted sleep are common mental or emotional health outcomes of COVID-19.*

**Keywords:** Domains, Wellness, Post covid, Information Technology, Working women, Management

## **Introduction**

Women in Indian society have always been inequality against and excluded from political, economic, and family matters (Jayal, 2006), despite the enormous amount of work that women must perform on a daily basis to support their families' their opinions (Maslach, 2006). Indian women have distinguished themselves in various sectors of life (Sharma, 2014) as legislators, orators, attorneys, doctors, administrators, and diplomats as a result of their newly found freedom. Women are not only entrusted with important tasks, but they also carry out their responsibilities with honesty and sincerity. As far as the health or wellness status is concerned, women's perception of their own health is poor as compared to men (Wolinsky, 1992). Health status is no

longer considered an outcome solely of lifestyle choices. It is now believed that health is also influenced by social, political, and economic factors. The IT industry is currently experiencing significant weaknesses as a result of the current economic downturn, as many companies are being forced to ask their employees to work from home due to public health concerns. The Novel Coronavirus disease outbreak has had a significant impact on everyone's lives (Singh, 2020). As a result, many women, particularly mothers, have reduced their working hours or, in some cases, quit their jobs altogether.

Women face many serious health concerns or issues (Coovadia, 2009) during the new normal. In order to focus on enhancing overall health and wellness in women in the Information technology sector, the researcher wanted to study wellness in different domains. Which is based on: respect, caring, compassion, and integrity, being non-competitive, non-hierarchical, collaborative, and evidence-based practices. Health is not just physical health, there are different dimensions that defined the wellness of health (Huber, 2011). Physical health, social health, occupational and financial health, environmental health, emotional health, intellectual health, and spiritual health (Wilcock, 2006) (Farrell, 2005) are the different domains of wellnesses that are considered for the current study.

When it comes to overall well-being in women, consuming well, exercising, and sleeping properly, regardless of wealth, are highly important for physical health or wellness. Women generally have poor physical health when they feel feelings of stress and feel anxious about their social support and physical health. Social interaction includes our relationships with others in our family, friends, and communities. It is very important for the quality of life to be financially healthy in today's complex economic climate. Knowing how finances and the economy work and making sound decisions are important for a healthy life. The climate in which women live has an effect on their health. The air breathes, the water drank, the toxins exposed to, the types of food eaten, the protection of homes, and the physical environment that surrounds us all lead to health or disease. Intellectually challenging and innovative activities, such as work, hobbies, training, or education, as well as being spiritually or culturally active, can help to manage the intellectual smooth running as well as enrich an individual's sense of well-being. Spirituality plays a significant role in the lives and well-being of many women. Faith, prayer, meditation, nature, or whatever else that gives individuals purpose or meaning in life are all examples of spirituality. Spirituality may influence our health-care decisions, outcomes, or healing. To conclude women's health has more than one dimension. While physical health is important to disease prevention, other aspects of women's health are just as important when looking at overall wellness. The different domains of wellness are shown in Figure 1.



**Fig 1: Showing domains of Health for overall wellbeing**

### Methodology

Based on the research study, and to fulfill the set objectives of the proposed study, The researcher plans to conduct a descriptive and cross-sectional research design. The sampling technique adopted for the research was simple random sampling. The quantitative data were analysed using STATA 12 version and data were coded, cleaned, and transformed using excel.

Figure 2A shows that the graphical representation of the survey and data collection mechanism for the current research was conducted in Bengaluru, and included women in the age group of 21 years & above, the study will cover working women from the IT sector, and those who give consent to participate and want to know their health status or wellness in different wellness domains will be considered for this assessment. Socio-demographic details, work-related, and different wellness of domains data were collected through interviews and analysed in the present study. A total of 446 participants provided their voluntary consent to complete the study survey.

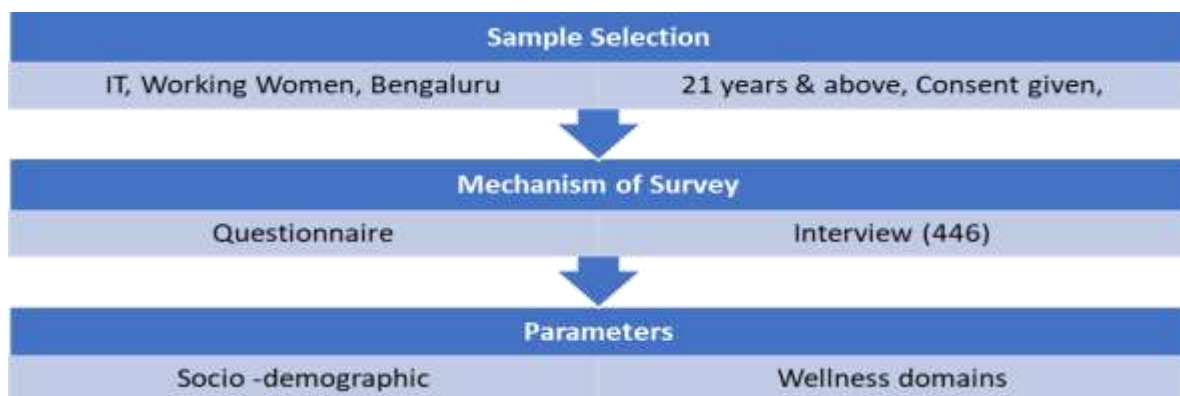




Figure 2A: Survey and data collection mechanism

Figure 2B shows that graphical representation of parameters choice and selection done for the study. sociodemographic profile for the respondents, work-related and wellness data was known. Workplace difficulties better understanding of experienced professional. The data collected from the working women in the IT sector, were physical wellness, social wellness, financial wellness, environmental wellness, emotional wellness, intellectual wellness, and spiritual wellness challenges and struggles documented in the studies. The pandemic has been particularly difficult on women resultant work-life imbalance led to mental stress, social problems, financial, physical and along with increased number these issues stress, anxiety, depression, and disrupted sleep are common mental or emotional health outcomes of COVID-19.

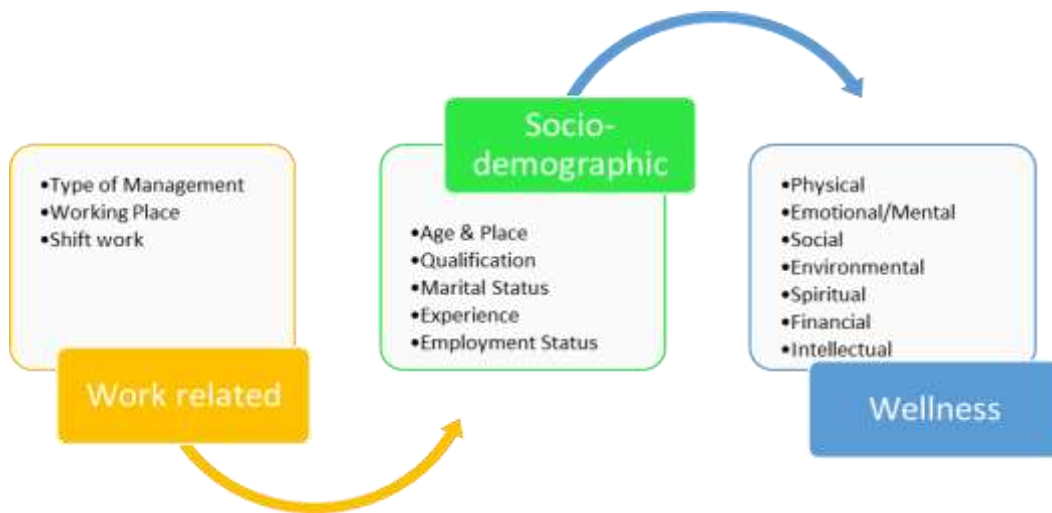


Figure 2B: Parameters choice and selection

### Results

The table 1 indicates the sociodemographic and work-related factors of working women in the IT sector. The respondent's age is less than 30 years, lives in Bengaluru urban district, graduated, married, permanent in position, works in middle-level management, and has an income of Rs. 50000-74999, less than 10 years of work experience, and all are working remotely or working from home and the majority of them don't work in shifts during the study period.

Table 1: Socio-demographic and work-related variables of IT sector working women

Socio-demographic Variables	N = 446	%
<i>Age (In completed Years)</i>		
Less Than 30 Years	230	51.57
31 – 40 Years	204	45.74
41- 50 Years	12	2.69
<i>Place (Locale)</i>		
Rural	14	3.14
Urban	432	96.86
<i>Level of Education</i>		
Diploma/Technical	9	2.02
Graduate	283	63.45
Post graduate,	152	34.08
Doctorate	2	0.45
<i>Marital Status</i>		
Married	276	61.88
Divorced/Separated/Widowed	2	0.45
Never Married	168	37.67
<i>Employment Status</i>		
Permanent	251	56.28
Contractual	152	34.08
Temporary/Parttime	3	0.67
Other	40	8.97
<i>Level of Management</i>		
Top Management	12	2.69
Middle Management	251	56.28
Lower Management	183	41.03
<i>Income</i>		
50000-74999	318	71.30
75000 & above	128	28.70
<i>Do shift work</i>		
Yes	5	1.12
No	441	98.88
<i>Work from home</i>		
Yes	446	100
<i>Years of Experience</i>		
Less than 10 years	381	85.43
10-20 years	63	14.13
Above 20 years	2	0.45

The distribution of overall domain wellness status among women employees in the IT sector during post covid was analyzed. The association between the variables different wellness and years of work experience and the results are presented and is shown in table 2.

Table 2: Percentage distribution of health/ wellness domains of working women of IT sector and association between wellness domains and years of work experience

Wellness Domains	Status	Work Experience						P-value	
		Less than 10 years		10-20 years		Above 20 Years			Total
		n (381)	%(85)	n (63)	%(14)	n (2)	%(0.45)	446(100)	
Emotional Wellness	Poor	313	70.2	38	8.52	1	0.22	352 (78.9)	0.000*
	Average	53	11.9	12	2.69	0	0	65 (14.6)	
	Good	15	3.36	13	2.91	1	0.22	29 (6.50)	
Environmental Wellness	Poor	84	18.83	16	3.59	2	0.45	100(22.4)	0.0848
	Average	25	5.61	3	0.67	0	0	28(6.28)	
	Good	272	60.99	44	9.87	0	0	318(71.3)	
Financial Wellness	Poor	119	26.7	26	5.83	0	0	145 (32.5)	0.000*
	Average	142	31.8	15	3.36	0	0	157 (35.2)	
	Good	120	26.9	22	4.93	2	0.45	144 (32.3)	
Financial Wellness	Poor	148	33.2	19	4.26	0	0	167 (37.4)	0.477
	Average	159	35.7	29	6.5	1	0.22	189 (42.4)	
	Good	74	16.5	15	3.36	1	0.22	90 (20.2)	
Spiritual Wellness	Poor	89	19.96	11	2.47	0	0	100 (22.4)	0.527
	Average	150	33.63	22	4.93	1	0.22	173 (38.8)	
	Good	142	31.84	30	6.73	1	0.22	173 (38.8)	
Intellectual Wellness	Poor	53	11.9	7	1.57	1	0.22	61 (13.68)	0.580
	Average	320	71.7	54	12.11	1	0.22	375 (84.1)	
	Good	8	1.79	2	0.45	0	0	10 (2.24)	
Physical Wellness	Poor	225	50.45	34	7.62	2	0.45	261 (58.5)	0.566
	Average	143	32.06	25	5.61	0	0	168 (37.7)	
	Good	13	2.91	4	7.62	0	0	17 (3.81)	

**\*Pearson’s chi-square test was performed to assess the association**

Table 3 depicts the Pearson’s correlation coefficient and was calculated to evaluate the strength of the relationship among the study variables. Correlation significant at 0.05 level and 0.01 were retained in the table. A significant low, and moderate correlation found between the variables mentioned in the table.

Table 3: Correlation between Age, Work experience, Income and Wellness of domains

Variables	Age	Experience	Income	Physical	Spiritual	Social	Financial	Intellectual	Environmental	Emotional
Age	1									
Experience	.455**	1								
Income	.185**	.319**	1							
Physical	-.048	-.094*	-.153**	1						
Spiritual	-.041	-.078	-.022	.043	1					
Social	.064	.086	.001	-.014	-.592**	1				
Financial	-.037	-.018	-.067	.011	-.412**	.436**	1			
Intellectual	-.047	.006	-.043	-.041	.072	-.029	-.149**	1		
Environmental	-.003	.017	.031	-.018	.086	-.302**	-.523**	.129**	1	
Emotional	-.115*	-.082	-.190**	.141**	.094*	-.085	-.081	-.001	.086	1

*\*Correlation is significant at the 0.05 level, \*\*Correlation is significant at the 0.01 level.*

Table 4: Multivariate logistic regression analysis of factors associated with IT working women health who diagnosed during the post covid

Factors	Health Problems		Total 446(100)	Odds Ratio [95% CI]	p-value
	Yes 217(48.6)	No 229(51.3)			
<b>Emotional wellness</b>					
Loss of Interest					
Several days	68(15.3)	82(18.4)	150(33.6)	0.45(0.22-0.90)	0.025
More than half the days	46(10.3)	30(6.73)	76(17.04)	0.30(0.11-0.78)	0.013
Nearly every day	24(5.38)	26(5.83)	50(11.21)	0.10(0.03-0.31)	<0.001
Trouble Sleeping					
More than half the days	69(15.5)	38(8.52)	107(24)	5.09(2.27-11.42)	<0.001
Self-blame					
Nearly every day	39(8.74)	26(5.83)	65(14.6)	3.24(1.19- 8.85)	0.022
Agitation/retardation					
More than half the days	123(27.6)	76(17.0)	199(44.6)	3.21(1.69-6.11)	<0.001
Not being able to stop or control worrying					
Several days	58(13)	86(19.3)	144(32.3)	0.45(0.23-0.88)	0.020
Nearly every day	26(5.83)	6(1.35)	32(7.17)	6.38(1.15-35.44)	0.034
Trouble relaxing					
Several days	78(17.5)	140(31.4)	218(48.9)	0.35(0.19-0.66)	0.001
More than half the days	37(8.30)	9(2.02)	46(10.31)	4.31(1.27-14.61)	0.019
Being easily annoyed or irritable					
Several days	77(17.3)	57(12.8)	134(30.0)	7.99(3.46-18.43)	<0.001
More than half the days	54(12.1)	36(8.07)	90(20.2)	5.46(2.18-13.66)	<0.001
<b>Environmental Wellness</b>					
Working smoke alarm in my home/Office					
Strongly Disagree	31(6.95)	22(4.93)	53(11.9)	0.18(0.06-0.56)	0.003
<b>Financial Wellness</b>					
I can easily locate the paperwork & doc for all of my insurance policies, investments & deeds for home, car etc					
Disagree	35(7.85)	30(6.73)	65(14.6)	0.23(0.08-0.67)	0.007
Strongly Disagree	44(9.87)	24(5.38)	68(15.3)	0.24(0.08-0.67)	0.007
I always have a target limit in mind of what I can afford to spend on a daily basis, (supermarket, mall, drugstore, go out for lunch, dinner)					
Agree	45(10.1)	50(11.2)	95(21.3)	0.17(0.06-0.50)	0.001
Neither agree nor disagree	48(10.8)	59(13.2)	107(24)	0.37(0.14-0.97)	0.042
I check my credit rating at least once every three years and before every major purchase					
Agree	45(10.1)	50(11.2)	95(21.3)	0.24(0.09-0.67)	0.006
Strongly Disagree	45(10.1)	32(7.17)	77(17.3)	0.36(0.13-0.99)	0.048
<b>Social Wellness</b>					
Hit, kicked, punched or hurt by someone within the past year					
No	162(36.3)	197(44.2)	359(80.5)	0.23(0.10-0.51)	<0.001
Someone to take you to the doctor if you needed it					
A little of the time	63(14.1)	53(11.9)	116(26.0)	2.48(1.06-5.80)	0.037
Most of the time	15(3.36)	21(4.71)	36(8.07)	7.26(1.75-30.23)	0.006
All of the time	15(3.36)	16(3.59)	31(6.95)	6.16(1.37-27.70)	0.018
Someone to prepare your meals if you were unable to do it yourself					
A little of the time	74(16.6)	59(13.2)	133(30)	4.47(1.95-10.28)	<0.001
Some of the time	68(15.3)	72(16.1)	140(31.4)	4.99(2.11-11.79)	<0.001
All of the time	12(2.69)	11(2.47)	23(5.16)	6.57(1.26-34.18)	0.025
Someone to help with daily chores if were sick					
A little of the time	70(15.7)	85(19.1)	155(34.8)	0.40(0.17-0.91)	0.030
Someone to love and make you feel wanted					
A little of the time	78(17.5)	62(14)	140(31.4)	2.30(1.07-4.94)	0.032
Someone to get together with for relaxation					
A little of the time	79(17.7)	59(13.2)	138(30.9)	2.78(1.26-6.09)	0.011
Most of the time	9(2.02)	25(5.61)	34(7.62)	0.16(0.04-0.65)	0.011
Some to do things with to help you get your mind off things					
Most of the time	7(1.57)	19(4.26)	26(5.83)	0.18(0.03-0.91)	0.038
All of the time	12(2.69)	22(4.93)	34(7.62)	0.16(0.04-0.68)	0.013
<b>Spiritual Wellness</b>					
Often stop to count my blessings					
Neither agree nor disagree	24(5.38)	16(3.59)	40(8.97)	5.47(1.62 -18.48)	0.006
Strongly agree	52(11.7)	79(17.7)	131(29.4)	7.45(1.94 -28.59)	0.003
I usually don't hold grudges I usually forgive those who have done wrong by me					
Neither agree nor disagree	17(3.81)	32(7.17)	49(11)	0.10(0.03-0.31)	<0.001
Agree	54(12.1)	63(14.1)	117(26.2)	0.32(0.10-0.96)	0.042
I feel connected to a power or purpose great than myself					
Disagree	59(13.2)	43(9.64)	102(22.9)	0.36(0.16-0.81)	0.014
<b>Physical Wellness</b>					
How many hours of sleep do you typically get per night					
4 to 5 hours	34(7.62)	36(8.07)	70(15.7)	0.28(0.09-0.87)	0.028
6 to 7 hours	88(19.7)	119(26.7)	207(46.4)	0.28(0.12-0.69)	0.006
8 to 9 hours	52(11.7)	46(10.3)	98(22)	0.31(0.12-0.83)	0.020
Do you do Physical activity?					
No	137(30.7)	162(36.3)	299(67.0)	0.36(0.18-0.71)	0.003
Wear helmet, seat belt?					
Very often and sometimes	56(12.6)	81(18.2)	137(30.7)	0.41(0.20-0.84)	0.015

Exposure variables that were significantly associated with health among IT working women at a 10% level ( $p < .10$ ) in the univariate logistic regression analysis were considered for inclusion in the multivariate logistic regression analysis. The inclusion of each of these variables into the multivariate model was done using a forward stepping process. Those variables which altered the coefficient of at least one preceding variable by 10% when included in the multivariate model and significant at a 5% level ( $p < .05$ ) were retained in the final model. The significance of the addition of each new variable into the model was compared with the previous model using the likelihood ratio test. The results are reported as an adjusted odds ratio (OR) with a 95% confidence interval (CI) and p-values for the multivariate regression analysis and the results are represented in the table 4.

### Discussion

In figure 3 the graphical representation of factors associated with health problems who are diagnosed with health problems and the relationship between the variables and domains were shown. Working women in the IT sector had faced many problems during post covid hence the researcher considered these as important risk factors and also the relationship found between the variables between sociodemographic and different wellness domains. Emotional wellness factors associated with health problems are loss of interest in doing things, trouble sleeping self-blame, agitation/retardation, not being able to control worrying, trouble relaxing, and irritability. Physical wellness factors associated with health problems are safety, physical activity, and hours of sleep. Social wellness factors associated with a health problem are violence, someone to Help, relaxation, feeling wanted, daily chores, preparing meals, take to the doctor. Financial wellness factors associated with health problems are Target Limit to spending money, can locate the financial related document, and checking credit ratings before every purchase. Environment wellness factors associated with health problems is a smoke alarm. Spiritual wellness factors are had a strong purpose in my life, don't hold grudges, and often stop to count blessings.

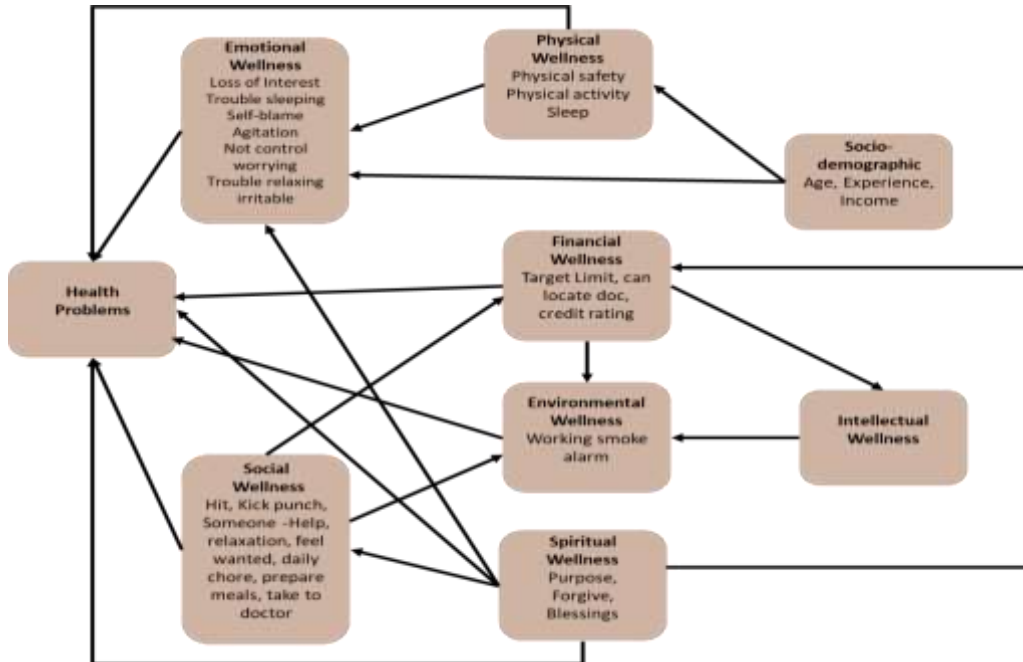


Figure 3:

Factors associated with health problems and the relationship between the domains among IT working women

Based on age, the majority of the respondents 51.6% were of age less than 30 years. In the study, less

than 30 years age group women professional is higher compare to the other two groups. Respondents who participated in the study living in the urban locale were more compared to rural places. The majority of the respondents 63.45% were graduates. The results show that about 61.88% of the respondents are married. From the table, it is clear that most of the study respondent's employment statuses were permanent 56.28. About 56.28% of the respondents were working at the middle management level. About 71.30 % of women employees earn a monthly income of Rs. 5000-74999. The respondents who participated in the study don't do shift work 98.88% during the period. Every respondent who participated in the study was working from home. From the results, it is clear that the meaningful work experience for the women employees was 5.42 years and SD was 3.77 Years ( $5.42 \pm 3.77$ ). Here the standard deviation is small, then this tells that the result is close to the mean value. On the basis of experience, the majority of respondents (85.43 %) were having less than 10 years of experience presented in table 1.

Overall, 78.9% of IT working women employees were found to have Poor Emotional health. 71.3% of IT women employees were found to have good or great environmental health, 35.2% of IT women employees were found to have average financial health, 42.4% of IT women employees were found to have average social health, 38.8% of IT women employees were found have average and good spiritual health, 84.1% of IT women employees were found have average Intellectual health, and 58.5% of IT women employees were found have poor physical health. The highly significant ( $p < 0.01$ ), which indicates that there is an association between the variable emotional wellness and work experience, financial wellness, and work experience were presented in table 2.

Age was found to be significantly positively correlated with years of experience ( $r = .455$ ,  $p < 0.000$ ), Income ( $r = .185$ ,  $p < 0.000$ ) indicating that, as age increases experiences and income also increase and significantly negatively correlated with emotional health ( $r = -.155$ ,  $p < 0.015$ ) indicating that age increases emotional health decreases. Years of experience were found to be significantly positively correlated with Income ( $r = .319$ ,  $p < 0.000$ ), indicating that with increasing years of experience income increases. Years of experience were found to be significantly negatively correlated with physical health ( $r = -.094$ ,  $p < 0.047$ ) indicating that years of experience increase physical health decreases. Income was found to be significantly negatively correlated with Physical health ( $r = -.153$ ,  $p < 0.000$ ) and followed by Emotional health ( $r = -.190$ ,  $p < 0.000$ ) indicating that Income increases physical health and emotional health decreases. Physical health was found to be significantly positively correlated with emotional health ( $r = .141$ ,  $p < 0.003$ ) indicating that as physical health increases emotional health also increases. Spiritual health was found to be significantly negatively correlated with social health ( $r = -.592$ ,  $p < 0.000$ ) followed by significantly negatively correlated with financial health ( $r = -.412$ ,  $p < 0.000$ ) indicating that spiritual health increases social health and financial health problem decreases. Further, it was found to be significantly positively correlated with emotional health ( $r = 0.094$ ,  $p < 0.047$ ) indicating that spiritual health increases emotional health increases. Social health was found to be significantly positively correlated with financial health ( $r = .436$ ,  $p < 0.000$ ) indicating that social health increases financial health increases. Further, it was found to be significantly negatively correlated with environmental health ( $r = -.302$ ,  $p < 0.000$ ) indicating that social health increases environmental health decreases. Financial health was found to be significantly negatively correlated with Intellectual health ( $r = -.149$ ,  $p < 0.002$ ) and followed by environmental health ( $r = .523$ ,  $p < 0.000$ ) indicating that financial health increases Intellectual and environmental health decreases. Intellectual health was found to be significantly positively correlated with environmental health ( $r = .129$ ,  $p < 0.007$ ) indicating that intellectual health increases environmental health increases were presented in table 3.

The study highlights the wellness status of IT sector working women in the new normal period. Emotional wellness factors which include depression and anxiety factors are trouble relaxing more than

half the days had five times increased the risk of health problems (Brown, 1975), self-blame nearly every day had three times increased the risk of health problems (Fairchild, 2008). Agitation/retardation (Roberts, 2000) nearly every day had three times increased the risk of health problems may be due to sleep disturbance and this may lead to future depression. Not being able to stop or control worrying nearly every day six times increased the health problem (McClure, 2018), trouble relaxing more than half the day four-time increased the risk, being easily annoyed or irritable several days Seven-time increased the risk, being easily annoyed or irritable more than half the days five-time increased the risk among working of IT sector. According to another study results who experienced anxiety-related issues more than half of the days or nearly every day, and fear of not having money in the future or current money issues or may be due to smoking or major health problems also seriously affects the quality of women social life and working lives (McClure, 2018; Breivik, 2006). In the current study also working women in the IT sector had faced the same challenges due to the impact of COVID people are fearful of losing money and job. Social wellness factors associated with health problems among IT working women someone takes to the doctor most of the time had seven-time increased the risk, compared to a little of the time had two times increased the risk (Wildavsky, 1983) (Aronsson, 2000). Someone to prepare meals if we're unable to do it themselves a little of the time had four-time increased the risk, someone to love and make you feel wanted a little of the time had two times increased the risk, someone to get together with for relaxation a little of the time had two times increased the risk among working women of IT sector (Babu BV, 2010). Spiritual wellness factors often stop to count my blessings neither agree nor disagree had five-time increased the risk among working women (Fredrickson, 2008) often stop to count my blessings (Avants, 2005) strongly agree had seven-time increased the risk was observed. A study observed that Women having anxiety, hypertension, diabetes mellitus, pain intensity, lower family income, depression, sexual dysfunction and not having a partner were factors negatively associated with quality of life (Da Luz, 2018). Working women in the IT sector definitely need to work on wellness, diet, regular health check-up, sleep, habits, and exercise. Overall, women were less likely to experience improved health outcomes when working at home (Oakman, 2020).

As a result of the above discussion, it is evident that women working in the IT field who work from home face lots of issues. In other ways, they are also vulnerable. Even though they are equipped with certain amenities, they are insufficient. After the pandemic companies have initiated remote work due to government rules. Working women in the IT sector are not free from dual responsibilities which leads to more physical and psychological or emotional health problems. Emotional, financial, and physical health followed by social are the leading as expressed by the IT sector working women and thereby these problems are also causing health conditions of the working women this may lead to impact organization productivity but more affected individually.

### **Strengths and Limitations**

The study demonstrates the role of importance of different wellness domains that need to look for overall wellbeing. The study showed the interrelationship between the sociodemographic, physical, emotional, social, spiritual, intellectual, environmental, and financial health domains. The study identified factors /predictors contributing to health problems in different domains during the new normal. This study substantially contributes to the area of IT sector working women's health problems/ workplace health management. A study was conducted during the Pandemic & with respondents working from home. The study only focused on Working Women in the Information Technology sector from Bengaluru Karnataka. The study sample consisted of working from home IT professionals from only 25 companies. The findings might not apply to all women working in the IT sector.

### **Conclusion**

The study has been able to highlight the post covid wellness status of working women professionals in the IT sector in the Bengaluru, Karnataka that the health or well-being of the IT sector working women



is affected adversely in the pandemic and women faced challenges individually while working from home, as it was difficult for them to draw a line between personal and professional life. The pandemic has been particularly difficult on women resultant work-life imbalance led to emotional issues, social problems, financial, physical and along with increased number these issues of stress, anxiety, depression, and disrupted sleep, no physical activity, safety are outcomes of COVID-19. A significant effect or impact was found between emotional wellness and years of work experience and financial wellness. The majority of the women in the study don't do regular health check-ups. With respect to work experience on the emotional wellness of IT women, a significant difference was found between 10-20 years, above 20 years, and less than 10 Years, above 20 years. And With respect to work experience on the financial wellness of IT women, a significant difference was found between 'Less than 10 Years, above 20 years and less than 10 years, 10-20 years. But the perception of years of work experience group is different.

However, in the future, organizations have the chance to influence systems and structures to give more benefits and equity to women and for individuals to help one another in the process of empowering and enabling women to improve their circumstances and create fulfillment during the emergency periods. Employees should be cared for by organizations because they are a source of income and produce the finest results. As a result, it is the organization's responsibility to look after the welfare of its employees. Workplace stress should not cause family disintegration. Working women's children will act strangely, which will have an impact on society in the future. Despite having their own Code of Conduct and Act, rules should be put into practice. Improving women's health is important for women, their families, communities, and societies as a whole.

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# A Study on various coping strategies embraced by women managers with reference to select IT firms

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## Abstract

A relatively continuous phenomenon in modern lifestyles is stress at work. Over the past century, there have been significant changes in the nature of employment, and those changes are currently occurring quickly. Almost all vocations have been impacted. Everybody in the academic world, including kindergarteners, students, and office workers, entrepreneurs, and labourers who are also homemakers, face stress when managing their household affairs.

A healthy dose of stress can always operate as an energizer or motivator, encouraging people to put up the effort and finish the task at hand. However, excessive stress can have negative effects on a person's personality traits and lead to physical and interpersonal issues. Occupational stress is the detrimental physical and emotional reactions that arise when a worker's needs, resources, or abilities are not met by the demands of their job. According to Selye [1936], stress is "a dynamic activity in which a person encounters an opportunity, limitation, or demand."

**Key Words:** *Stress, Occupational stress, motivator, negative effects, opportunity, dynamic activity.*

## Introduction

The Latin word "Stringer," which means "to grasp," "to compress," or "to bind," is where the name "stress" originates. Stress was a phrase used to describe hardship, strain, adversity, or affliction in the seventeenth century. The phrase was used in the eighteenth and nineteenth centuries to refer to a thing or a person when there was force, pressure, strain, or a significant effort. Hans Selye initially established the idea of stress in the life sciences in 1936.

Stress is described by Hans Selye as a "adaptive response to the external circumstance that results in physical, psychological, or behavioural deviance for organisational members,". Stress as both a beneficial aspect and a negative side. Distress is a negative side force that deviates from regular functioning. Eustress, which refers to a healthy, constructive outcome of a stressful situation, is a positive side of stress. People are inspired by this experience to set and achieve goals and succeed in all aspects of their lives.

## DEFINITIONS:

- *"job stress can be defined as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health and even injury." [Stress at work, United states National Institute of Occupational safety & Health, Cincinnati 1999.]*
- *"the emotional, cognitive, behavioral and physiological reaction to aversive and noxious aspects of work, work environments and work organizations. It is a state characterized by high levels of arousal and distress and often by feelings of not coping." [Guidance on work –related stress: Spice*

**of Life-or kiss of death**, European commission, Directorate- General for Employment & Social Affairs.]

## STRESS AND GENDER

It is complicated how gender, the workplace, and stress are related. The predominant element that appears to amplify the effects of stress on women is the continued predominance of women in the provision of family care. It is commonly known that full-time female employees have a larger overall workload than full-time male employees, especially when it comes to taking care for their families.

## STATEMENT OF THE PROBLEM

One of the strongest industries in the world today is the information technology (IT) sector. The global economy is largely driven by the information technology sector. This sector is expanding quickly because to economies of scale and insatiable consumer and business demand.

The Indian workforce in the information technology sector has established a reputation as "low cost" but "high quality" technical professionals, enabling the sector to maintain a positive growth rate. The type of job that has been produced in this area has been shaped by this particular characteristic. Three key elements of work and employment in this sector are mobility, flexibility, and employee relationship management. In this industry, employees must be very mobile and willing to move both within India and "onsite" as well as between positions that are "offshore" and within India. Companies preserve flexibility by using techniques for managing resources like "the bench" and certain factors when determining staff salaries. The third element of this industry is employee relationship management, in which the recruitment, training, and retention of employees are highly prioritised.

## AIM OF THE STUDY

In India the price as a results of absence and loss of productivity as a result of stress is calculated to be roughly Rs. 500 million, with managers and high level staff affected by high levels of labor stress. Analysis has been conducted on stress inherent in specific teams at intervals, the work context with some findings, suggesting that roughly 30- 40% of Indians suffer from high levels of stress. Typically the analysis focuses on the assorted sources of stress and on the symptoms related to the expertise of stress. The degrees of stress within the Indian organizations area are exceptionally high. The seriousness of the strain expertise in India ought to encourage analysis to not solely specialize in the causes and consequences of stress however conjointly on managers' address their experienced stress with the aim to help organizations and people to develop improved ways and programmes to counter the negative result of stress.

## OBJECTIVE OF THE STUDY

1. To Identify the various coping strategies used by women managers

## HYPOTHESIS

H0: There is no significant correlation exists between coping strategies and stress.

**Population of the study**

The population of the study includes employees working in managerial cadre starting with those who have 4+ years of experience (Lower level, Middle Level & Senior Level managers) from 17 IT firms listed in Telangana.gov.in official government website and Bangalore using the lottery method.

**Sampling Method and Sample size**

For the purpose of survey, sample was made through a stratified sampling method. A total sample of 672 women managers are selected for the study. For the purpose of the analysis, the IT professionals are classified as senior level, middle level and lower level professionals. The Senior Associates, Team leaders, Project leaders, Project managers, senior software engineers, and senior manager are considered as higher level executives. Test analyst, System analyst, System administrator, Data base administer, System executive are classified as middle level professionals.

The Software developer, Software engineer, Software technician, Hardware technician and Trainee are viewed as lower level professionals. Only those professionals who have already served for more than 4 years in the companies alone considered in the study. The sample size of 672 overall (from the organizations under study) was considered to guarantee a sufficient number of respondents.

**Sources of data**

Both primary and secondary data have been collected for the study. The primary data is collected from the IT professionals with the help of a questionnaire and personal interviews. A structured and validated questionnaire has been used for collection of primary data.

The secondary data have been collected from the sources like books related to stress management, previous research studies, national and international journals and on line journals.

**Table 1-VARIOUS COPING STRATEGIES USED BY WOMEN MANAGERS**

**Pattern Matrix<sup>a</sup>**

	Component								
	1	2	3	4	5	6	7	8	9
Use entertainment sources like TV, Music etc.	.759								
Write stress diary	.707								
Delegate responsibility instead of doing it alone		.733							
Complain		.513							
Engage in physical exercises		.507		.422					

Prepare an action plan		.698						
Set goals daily and prioritize work		.600						
Manage time		.519						
Seek professional help			.696					
Smoke or drink alcohol				.801				
Talk with friends/ family			.451	.580				
Engage in a hobby like reading, painting etc.					.620			
Daydream					.601			
Drink coffee or tea					.571			
Try to look at things differently								
Do meditation or yoga								
Leave the tension at work							.818	
Sleep more						.782		.515
Planned break from work								.711
Quit the job								.638

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

Table 2- Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings <sup>a</sup>
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
	1	1.673	8.363	8.363	1.673	8.363	8.363
2	1.555	7.773	16.136	1.555	7.773	16.136	1.466
3	1.373	6.866	23.003	1.373	6.866	23.003	1.289
4	1.316	6.581	29.583	1.316	6.581	29.583	1.128
5	1.269	6.343	35.927	1.269	6.343	35.927	1.334
6	1.232	6.159	42.086	1.232	6.159	42.086	1.316
7	1.172	5.861	47.947	1.172	5.861	47.947	1.308
8	1.044	5.219	53.166	1.044	5.219	53.166	1.147
9	1.005	5.023	58.189	1.005	5.023	58.189	1.242
10	.958	4.789	62.978				
11	.926	4.630	67.608				
12	.896	4.480	72.088				
13	.831	4.154	76.242				
14	.829	4.147	80.389				
15	.772	3.859	84.247				
16	.724	3.621	87.868				
17	.686	3.428	91.296				
18	.660	3.302	94.598				
19	.550	2.750	97.348				
20	.530	2.652	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

**FINDINGS:**

**Coping Dimensions**

Below is a discussion of the major coping aspects that underlie the different coping mechanisms employed by the respondents taken from the table.

### F1 Relaxation coping

This is emerged as the most important coping dimension accounting for 7.466 % of total variance. 2 statements are found to be loaded. The strategies include use 'entertainment sources like TV, music etc.' and 'write stress diary' with the loadings of 0.759 and 0.707 respectively. The factor's loading pattern points to a high correlation between the variables. Contrarily, Mittal (1995) discovered that Indian managers used confrontation as the most preferable method of handling role stress.

### F2 Pass the buck coping

This is the second most significant coping feature that has evolved accounting for 7.266 % of total variance. 2 statements are found to be loaded. The strategies include 'delegate responsibility instead of doing it alone' and 'complain' with the loadings of 0.733 and 0.513 respectively.

### F3 Time Management coping

Time management coping has been identified through factor analysis as another coping element. This factor has three loaded variables that together account for 6.580% of the total variation. The table shows that the variable with the highest loading, 0.698, is "develop an action plan for the work." The variables "establish goals everyday and prioritise the job" and "manage time" have been placed after this with loadings of 0.600 and 0.519,

respectively. This shows that facing the issue head-on and devoting time and effort to solving it is the coping strategy employed by the responders.

### F4 Diversion coping

The second crucial coping factor that the managers use is "Diversion coping," which accounts for 6.391% of the overall variance. The chart shows that this component consists of three variables: "drink coffee or tea," which has a loading of 0.571, "day dream," which has a loading of 0.601, and "engage in a pastime like reading or painting, etc." Although these coping mechanisms don't immediately aid in problem solving, they do assist in shifting a person's focus from the issue to leisure activities, which aids in the development of both physical and psychological resources for coping with role stress. As a result, this aspect aids in shifting a person's focus away from a problem and onto recreation, allowing them to intentionally engage with their surroundings and adapt to it.

### F5 Devil-May-Care coping

The employees' usage of "Devil-May-Care coping" has also been recognised by factor analysis as a coping strategy. It is responsible for 5.635 percent of the overall variation. "Leave the tension at work" and "Sleep more" are two things that pertain to individual use and have loadings of 0.818 and 0.575, respectively. Managers don't appear to rely on getting away from the stress at work, a sign of the scary nature of role stress. However, the impact is very fleeting.

### F6 Quitting coping

The above mentioned coping strategy, which involves delaying a circumstance that one feels unprepared to handle, has come to be seen as less significant. Two statements are discovered to be loaded on this factor, which accounts for 5.624 percent of the overall variation. The interventions that fall under this category of tactics include "planned break from work" and "quitting the job." It can be claimed that techniques involving servile behaviour toward the problem have loaded on this element



because the employment of these tactics does not tackle the problem that is causing stress. This suggests that responders deal with stress by generally submitting to the circumstances.

## SUGGESTIONS:

Around the world, stress is an essential and unavoidable component of contemporary civilization. Your body and mind can be severely affected by stress, which can cause everything from irritation, heartburn, and tension headaches to persistent depression, heart disease, and possibly even cancer. While you can't completely get rid of stress, you can surely learn to control part of it and your body's, mind, and emotions' reactions to the rest.

The IT sector has developed into one of the strongest in the world. It is one of the main forces boosting the world economy. This sector is expanding quickly because to economies of scale and insatiable consumer and business demand. In this industry, service providers are known for meeting stringent deadlines set by their clients, operating across time zones, relying on one another in teams, multitasking, engaging with more offshore clients, and putting in lengthy workdays. The focus area for information technology firms right now is stress management in order to address the alarmingly high turnover rate and the wellbeing of the professionals in the sector. The following are the steps which will help in combating stress at individual and organisation as a whole.

Programs for stress counselling are recommended in order to comprehend and address problems associated to stress and to manage the behavioural and emotional outcomes that pressure and anxiety have on employees.

It is advised that organisations implement spiritual programmes that aid in stress reduction in order to build a more vibrant and enriched platform, which in turn improves organisational performance.

It is recommended that organisations conduct stress audits to help employees understand the causes of their stress and how it affects them. This influences the creation of the most effective stress management plans.

Having friends is a great opportunity for everyone to practise social support, which is an important stress-reduction technique. This includes offering assistance to those who are experiencing life's stresses when they do. As a result, the IT sector should encourage social support by offering chances for social engagement between employees and their families. When workers are under pressure and in need of social support, those in leadership positions must also demonstrate a helpful leadership style. Junior employees can manage the stresses of the workplace by developing mentoring relationships with more experienced workers.

## **Conclusion:**

"A healthy mind resides in a healthy body." It has been established that a person's lifestyle has an effect on the release of stress-inducing enzymes in his body. As a result, the IT sector should instruct its workers to prioritise creating a healthy lifestyle by finding a balance between work and leisure time. The body can reduce its own stress by engaging in regular exercise. By offering its employees professional guidance on diet management and nutrition, the IT sector may play a useful role.

The IT Industry should recognize the need to take preventive care about employee stress. It should focus on the employees' health management. The IT companies should conduct regular workshops on diabetics, hypertension and cardiac care during office hours.

Though the society has been changing at a rapid pace for the better, there are some issues which still

exist in the society. The reins of the house still remain in the hands of women. Equal sharing of family responsibilities may bring about positive change.

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# Data Analytics Approach to Derive Business Benefits in Corporate Technical University

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## Abstract

*In the 21<sup>st</sup> century, one of the strategic assets that organizations rely upon are the various kinds of data that they generate on a day-to-day basis. While the organizations have started realizing the commercial value of this data from sales functions and business operations to improve the top line and bottom line of company, there is a unique opportunity that exists to adopt “Data Analytics” for corporate technical education to examine, understand, model, report and drive data driven for business outcomes. In this paper an attempt is made to describe Global Engineering Academy (GEA)’s – approach and methodologies used to deliver business value addition and support towards decision making for business leaders. How can the data analytics approach have been adopted for talent hiring from universities, technical competency analysis of employees, skill evaluation of talent as per customer needs, aligning right Talent for different opportunities etc. GEA has been able to achieve this through defining right processes, adherence to processes through corporate governance, dedicated focus on digital technologies and strategies etc. The complete lifecycle of data analytics with data flowing from multiple stakeholders to data modelling to business benefits are presented and discussed. Some of the potential benefits of data analytics in higher education for various stakeholders, as well as the implementation obstacles that might be anticipated are investigated too. Finally, it highlights on the impact of successful implementation of data analytics.*

## Keywords

Corporate Technical University, Dashboard, Data Analytics, Data pipeline, Business Intelligence

## 1. Introduction

Competency development analytics is an important part of competency and skill development for different background participants, modes of learning, access to learning, pedagogy, retention of knowledge and application of knowledge, especially in today’s complex scenarios. Academic analytics gives basic information on what is occurring in a particular program or initiative and how to manage performance issues, it is concerned with data analysis at the institutional level [1]. A wider approach covering range of knowledge and techniques, learning process, the ways in which these techniques have developed alongside information technology, and the reality that learning analytics objectives alter because of data-driven efforts creating new opportunities Learning analytics is concerned with the learning process[1]. It encompasses all activities in higher education that have an impact on administration, research, resource allocation, and management [2]. It is an approach to mining socio-technical data that is largely used in academic contexts and referred to as learning analytics [3]Recently, organizations have started adopting “Learning Analytics” in corporate technical universities by shifting Modern data analytics which is replacing the traditional data analytics to help business make “Strategic Decisions”, beings driven due to the increased awareness, cost and impact benefit, technology platforms and quick deployment, representation of integrated view of how Learning Analytics can be a powerful tool for higher education institutions [4] is documented.

To effectively use data, the ability to analyse diverse information sets, regardless of its origin, is required, and consolidating data stored in silos within institutions, managing and governing the data while securing sensitive information across databases is a key requirement for Big Data implementation in higher education [5]. Most organizations nowadays rely on structured data (numbers and categories). Big Data analysis approach to provide an opportunity to educational Institutions to use their Information Technology resources for betterment of student experience leading to better completion of courses and programs has been attempted [6]. Higher education institutions are functioning in a more complicated and competitive environment. Higher education institutions are under increasing pressure to respond to national and global economic, political, and social change, such as the growing need to increase the proportion of students in certain disciplines, embed workplace graduate attributes, and ensure that the quality of learning programs is both nationally and globally relevant. The significance of Big Data and Analytics in tackling current difficulties in higher education has been investigated and the perils of inadequate analytics in education and several impediments are identified for widespread adoption of more efficient data use [7]. There are several predicted problems related with the deployment of Big Data analytic tools in higher education. Some of them include difficulties in convincing consumers to accept Big Data as a means of implementing new procedures and managing change. There is also a significant expense associated with gathering, storing, and creating algorithms to mine data, a time-consuming and complex operation. Furthermore, because most institutional data systems are incompatible, combining administrative, classroom, and internet data can be difficult [5]. Even though universities have vast volumes of usable data, this data is scattered among departments and software systems and are not used to connect the dots. Powered by a cloud computing infrastructure that provides cost savings, scalability, agility, and modernization, this scenario may be modified so that colleges make efficient and coordinated use of the quantity of data they collect [8].

However, this does not represent the complexities and challenges of company/corporate data regarding learning analytics and business outcomes. According to IBM, 80% of the data created by organizations today is unstructured, and it might take the shape of text, video, audio, diagrams, graphics, or a mix of two or more types [9]. Many factors that influence big data analytics adoption and to assess the relationship between big data analytics, performance and knowledge management has been discussed in [10]. An integrated approach needs to be extended to corporate technical education and for deriving business benefits. Global Engineering Academy (GEA) is a corporate technical university at Larsen and Toubro Technology Services (LTTS) - a Global leader in the Engineering and R&D services having deep expertise in domain and technologies related to Aerospace, Automotive, Medical & life sciences, industrial product design, digital manufacturing etc. This paper presents the lifecycle of data analytics in a corporate technical university, how an attempt is made to rectify the challenges or shortfalls which have been discussed above. The architecture for overcoming the multiple stakeholders and data sources towards analytics and decision making. Starting with the collection of data from various stakeholders in multiple formats to modelling of the data and to present the data in a controlled manner to various stakeholders for making business decisions. The rest of the paper is organized as follows. In section 2, an overview of data analytics in corporate technical university is provided with the architecture, highlighting methods for gathering, analysing, and utilization of data. Various analytics and access-controlled dashboard views are represented in section 3 along with business suggestions and enablement of data driven decision making.

## 2. Data Analytics in Corporate Technical University

As learning and competency development in corporate and organisations evolve to meet the business requirements multiple stakeholders are coming together deliver the results and the data is in structures and unstructured sources, systems, and complexity. There is a need to have a framework to collaborate and benefit each stakeholder and drive business results. The Corporate Learning Analytics Architecture to Derive Business Benefits in Corporate Technical University of Global Engineering Academy for the

lifecycle is as shown in figure 1. We present the architecture, stakeholders, and the approach for the utilisation of the data for various business decisions. The proposed framework aims to lay the groundwork for further data analytics development and implementation to support learning and teaching in corporate technical universities and the importance of collaborative efforts to improve and realize these technologies is reflected in this paper.

The architecture starts with capturing of requirements and data from the stakeholders to data modelling and to data dashboards and reports which are access controlled to show only the relevant and authorised data and reports. As the data pipelines and reports amass more data its capability to predict, recommend and suggest business decisions and outcomes.

The various stakeholders in the lifecycle and their functionalities are:

- Business Unit (BU) is the stakeholder responsible for skill forecast, demand forecast and consumers of skilled Employee Data base.
- Business Operations (BO) is the stakeholder responsible for the overall operations of the Organization and primary stakeholders who has the oversight on the overall need, skill gap and business consolidation.
- Human Resource (HR) looks after talent acquisition, engagement, and talent retention along with maintenance of employee records
- Corporate Technical Competency development team, Global Engineering Academy (GEA) the enabler and responsible stakeholder for technical competency development in the Organization
- Employee and prospective employee’s engagement to enhance skill and technical knowledge

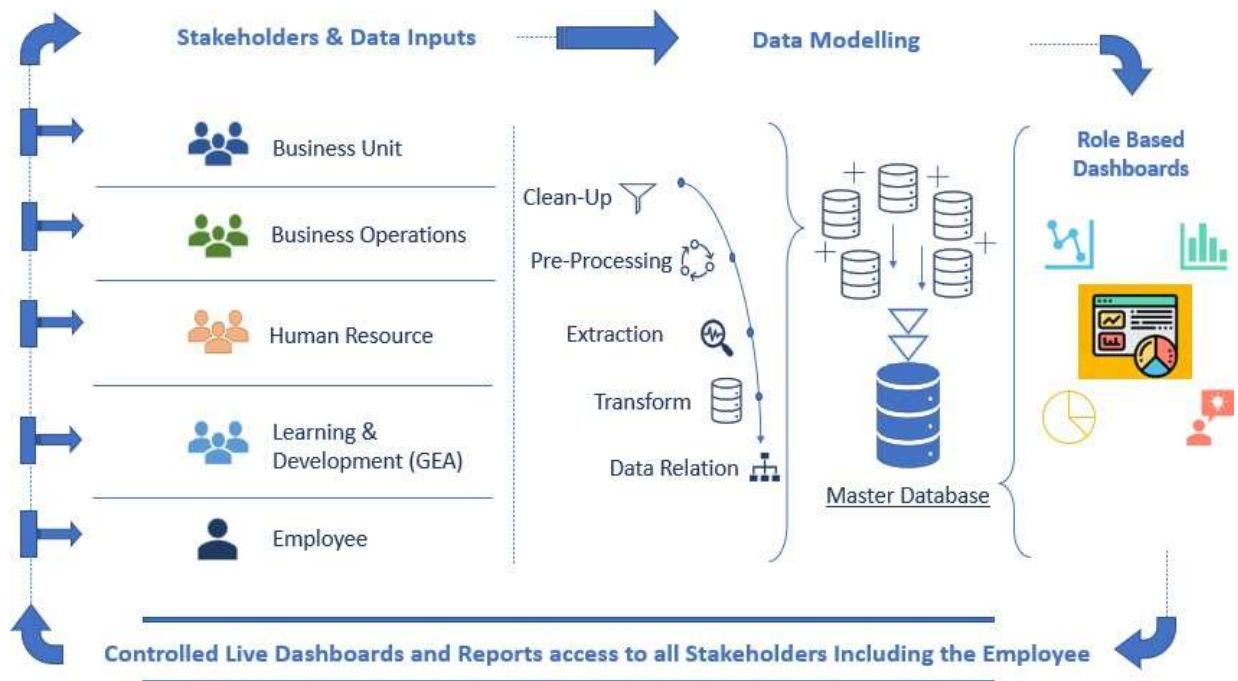


Figure 1: Corporate Learning Analytics Architecture to Derive Business Benefits in Corporate Technical University of Global Engineering Academy

## 2.1 Data Capture

The first step towards unlocking the benefits of large data from multiple systems and stakeholders is data

capture which necessitates the identification of unstructured and structured data that can disclose relevant and important information through various data pipelines. Some of the various systems being interfaced with data pipelines are

- Business Unit wise Demand of talent, skills, technologies, domain based on business need.
- Current skill and competency level of each employee through the periodic skill update portal called Skill matrix.
- Talent Competency planning and execution by the competency development team GEA along with syllabus finalisation, module sequencing, Business relevant case studies and applied projects, pre and post assessments and learning analytics
- Employee records and history from the HR Management System (HRMS)
- Learning management systems (LMS) tracking and records of learner's progress and history.
- Allocation and movement of employees between projects based on the skill needs. As data comes from different system, different complexity, and relations in the current architecture it caters to structures and unstructured data sets through the data model and relations.

## 2.2 Data Modelling

The captured data undergoes pre-processing so that we can work and focus on relevant data through data type alignment and clean up[11]. Pre-processing in different datasets example xml Data, excel based data conversion to tables etc. Leveraging Extract, Load and Transform (ELT) Process[12]. The Data of any type Structured or Unstructured, Numeric, Text is processed using Various techniques and technologies for integrating and publishing the data from multiple sources such as APIs, LMS, Excel Sheets and Database [12]. In extract phase different tables, unpacking and data types are extracted. This extracted data is loaded for the transformation phase, it gets filtered, calculations, translations, based on the raw data, relationships between multiple tables which can be one to one, one to many, many to many and associate data between multiple tables with unique identifiers. As the data tables are complex and multiple the dataset and source size grow very quickly and needs care to be taken to reduce the dimensionality to manageable and necessary outcome as a best practice [13].

## 2.3 Data Security

Data Security is an important aspect for corporate and organizations for being compliant to internal policies of data privacy, integrity, protection and security and governmental norms like General Data Protection Regulation (GDPR) [14]. Technology and tools today enables us to succeed in this overall endeavour [15] and with specific elements or characteristics of learning data and information in the entire lifecycle to ensure its correctness, transparency, integrity, completeness, and upkeep. Once the data's integrity and privacy are compliant it moves to stage of reports, analytics and insights discussed in the next section.

## 3. Reports, Analytics & Insights

The dashboards are accessible to each stakeholder in controlled manner and continuously evolved based on the requirements and data pipelines and the capabilities. Figure 2 showcases different aspects of Corporate Learning Analytics and Dashboards to Drive Business Benefits for each of the stakeholders. The leadership is able to take business centric decisions

- Place the right talent for the right opportunity with the support of live data, talent visibility, background, and skill level.

- Putting strategies in place for creation of net new talent based on the analysis of the skill gap in the organization against the business demands in pipeline. To overcome the talent scarcity in the market.
- Allocation and movement of employees between various projects based on the skill needs for quicker deployment and revenue realization.
- Employees gets deep insights into their skill and knowledge level benchmarking and areas of strength and improvement.
- Tracking of overall organisational movement of skills versus talent and location to help in scaling the organisation
- Young talent and Lateral talent addition into the organisation and skill need to maintain the ideal span of control and pyramid.
- Management of load and investment needs due to impact from the past batches and projections for the upcoming need.

Dashboard provides the Business Leader’s an overview of the critical data and insights in quantitative numbers, qualitative insights, live tracking as data has 4hrs refresh cycle with integrated view of number of trainings (completed, planned and ongoing), number of employees trained under various initiatives across various domains in the financial year as shown in figure

2.a. The same dashboard can be drilled down for detailed view and trend comparison in figure

2.b with is time-based drill down into the month level data. The Stakeholders are able to track the requirement fulfilment to demand, quality of the candidates in terms of their performance throughout the various modules, progress tracking to take decision on deployment. With the availability of Skilled talent pool in technologically challenging core engineering becoming a scarcity and reskilling/cross skilling the existing talent pool a strategic priority and the dashboard helps the leadership in enabling strategies reskilling/cross skilling existing workforce in the organisation as well adding net new talent based on their skillset needed and alignment.

(a) Consolidated view of the dashboard



(b) Detailed view of the dashboard





(c) Planning and Execution

(d) Employee Skill View

Figure 2. Four Figures showcasing different aspects of Dashboards - Corporate Learning Analytics to Drive Business Benefits

Figure 2.c depicts the fulfilment against demand provided by various stakeholders (Leadership and business operations) inside the organisation through their access to the dashboard takes up various business critical decisions like validate and track the supply and demand for Talents against requirements for each quarter, quarter on quarter and year on year too. Performance of a talent in various modules across the competency development lifecycle, strength, weakness, and gap analysis within the segment and across historical data is available. This includes strengthening the organisation towards the ideal employee pyramid.

Employee’s too have access to the dashboard as show in figure 2.d which summarises their skillsets and performance in various technical competency development trainings against the batch performance and historical benchmarks. Providing segment wise deep insights on the areas of strengths and improvements.

The year-on-year statistics helps in providing insights and recommendation for planning and streamlining effort of different stakeholders. An example being the recruitment insights for talent fulfilment for the business. Technical competency build engine leverages the insights to improve the learning outcomes, impact, pedagogy, content, engagement methods through the batch analysis, batch on batch analysis, module analysis, module feedback when delivered by multiple faculties, faculty load, faculty upskilling and reskilling and more. The analysis also helps to predict the training tracks to be executed for the upcoming batches and periodic reviews are also driven using the dashboard.

**Impact and Results**

The organization has started reaping the results of inculcating data analytics into the process in terms of volume, quality, and profitability, to name a few

- Technology Education in the organisation has been expanded from 14000 employees in Financial Year(FY) 21 to 18000 employees in FY22
- Impacting the baseline: Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) of the organization has made a significant upward journey from 16.6% in Quarter 4 (Q4) FY21 to 18.6% in Q4 FY22 and still growing through the quarters as seen in figure 3a
- Number of young talent (freshers) trained in FY22 stood at 3023 which is a more than three times the previous year FY21 where 838 graduates and postgraduates were trained as seen in figure 3b



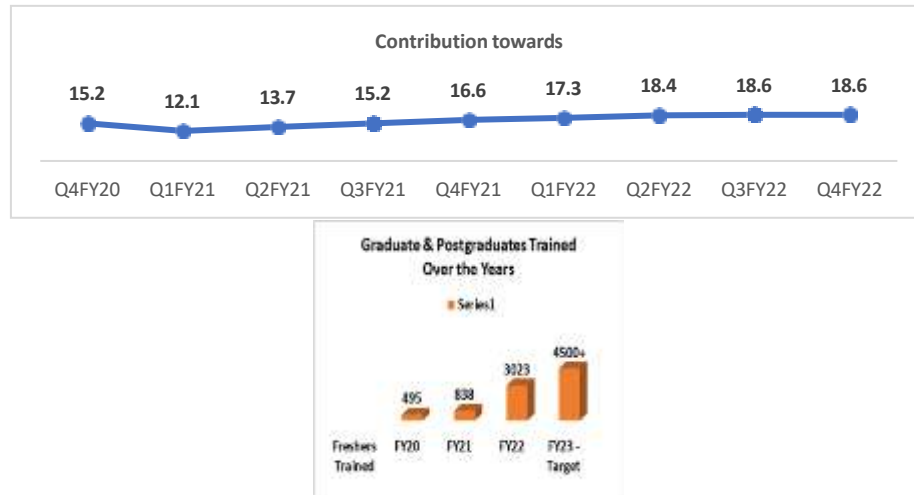


Figure 3: a) EBIT Graph over multiple quarters; b) Young talent (Freshers) trained year on year

#### 4. Conclusion

As learning and competency development data analytics enters a pre-paradigmatic stage, there is a need to build an streamline architectures and framework to organise data, knowledge and insights for different stakeholders to drive business outcomes. It is crucial for corporate technical universities to leverage data analytics. The proposed architecture and implementation aim to lay the groundwork for further data analytics development and implementation to support learning and teaching in corporate technical universities and the importance of collaborative efforts to improve and realize these technologies is reflected in this paper. It also illustrates how qualitative and quantitative reports support decisions on various aspects to help fit the right talent to the right need and have positive impact on revenue, along with creating net new talent in a depleting core engineering talent space to support scale and growth of organisation. As the database and data model improving, the business leaders are taking more data-driven decisions. Across wide range of actions including suggestions in talent hiring, technical competency analysis, talent’s skill evolution, right talent for different opportunities, reallocation to projects and many more. It has also impacted in us enhancing the existing data capture processes, data format revisit, controls on the extract and by transforming the data from different data pipelines before visualization through access-controlled dashboards.

#### 5. Future Work

For each of the stakeholders while multiple benefits are being leveraged there is scope of improvement. The live dashboards will continue and need to evolve to meet the different stakeholder needs factoring in additional data points and evolution towards comprehensive advanced machine learning algorithms to improve the suggestions, recommendations, and predictions. Streamlining of the system linkages especially in the data pipeline and unstructured and varied sources would improve the system refresh and update speeds of the systems. Future work will also entail defining and implementing rules and best practices in large complex corporate competency and learning analytics systems for the different actors of the system.

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# Detection based Multi-object Tracking for Self-driving Cars

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## **ABSTRACT**

*The basic intuition behind the self-driving cars is Multiple object tracking (MOT) which is an important technology in the field of computer vision with the combination of the state-of-the-arts methods (deep learning techniques). Among the current popular MOT methods based on deep learning, Detection Based Tracking (DBT) is the most widely used in industry, and the performance of them depend on their object detection network. At present, the DBT algorithm with good performance and the most widely used is YOLOv3-DeepSORT. Inspired by YOLOv3-DeepSORT, with the proposal of YOLOv7 network, which performs better in object detection, we apply YOLOv7 as the object detection part to the DeepSORT, and propose YOLOv7-DeepSORT. After experimental evaluation, YOLOv7-DeepSORT performances better in tracking accuracy.*

## **KEYWORDS**

Multiple Object Tracking, Object Detection, DeepSORT, YOLO.

## **INTRODUCTION**

Everything is now being automated in the 21st century, and automated cars are trending topics. A self-driving car runs from one place to another without human intervention having sensory input like cameras, sensors, lasers, and radars to provide the equipment to run the car on the roads. The cars have to identify the objects such as cars, trucks, traffic lights, animals, lanes, and pedestrians to be automated. We will be detecting eleven objects that are required for a car to travel on a public road.

The paper understudy with deep learning on autonomous cars where we can create a model that can avoid accidents on the road and provides better accuracy. Deep learning is a branch of machine learning that allows the computer to learn things in a hierarchy and from experience. It helps to reduce human effort because the computer learns from experience to understanding the computer's knowledge.

Multiple object tracking (MOT) generally refers to the detection and ID tracking of multiple targets in the video, such as pedestrians, cars, animals, etc., without knowing the number of targets in advance. Different targets have different IDs in order to achieve subsequent trajectory prediction, accurate search and other work. MOT is an important technology in the field of computer vision, which is widely used in automatic driving, intelligent monitoring, behavior recognition and other directions. In autonomous vehicle such as self-driving cars, object tracking is essential as it is a way to help navigate the vehicle controls and movements. In MOT, we must

not only face the challenges of occlusion, deformation, motion blur, crowded scene, fast motion, illumination change, scale change and so on in single object tracking, but also face complex problems such as trajectory initialization and termination, mutual interference between similar targets and so on. Therefore, MOT is still a very challenging direction in image processing, which has attracted the long-term investment of many researchers.

Visual object tracking has not developed for a long time, mainly in the past ten years. The early classical methods include Meanshift [1] and particle filter [2], but the overall accuracy of these algorithms is low, and they are mainly single object tracking, which is difficult to meet the requirements of complex scenes. In recent years, with the rapid development of deep learning, the performance of target detection has been improved by leaps and bounds, and the scheme of detection based tracking (DBT) has also been born. It has quickly become the mainstream framework of current MOT, which greatly promotes the progress of MOT tasks. At the same time, recently, there have been joint frameworks based on detection and tracking and frameworks based on attention mechanism, which have begun to attract researchers' attention.

## **THEORETICAL FRAMEWORK**

The current MOT framework can be divided into three types: MOT based on tracking by detection (DBT), MOT based on joint detection and tracking, and MOT based on attention mechanism. The first one is more widely used in industry, especially in the case of self-driving cars.

The process of DBT framework is: First, detect the targets in each frame of the video sequence, cut the targets according to the bounding box, and get all the targets in the image. Then, it is transformed into the problem of target correlation between the front and back frames. The similarity matrix is constructed through IoU, appearance feature, etc., and solved by Hungarian algorithm, greedy algorithm, etc. The tracking effect of this kind of algorithm depends on the performance of its object detection network. At present, the most used detection network is the YOLO series network, such as YOLOv3 [3], YOLOv4 [4], YOLOv5 [5]. SORT [6] and DeepSORT [7] are the most concerned tracking algorithms in the industry. The core of SORT is Kalman filter and Hungarian matching. The position of the target is predicted by Kalman filter, and the prediction result of the object detection network like YOLO is matched with the result of Kalman filter by Hungarian matching. SORT is a practical MOT algorithm. However, due to the variable target motion and frequent occlusion in reality, the algorithm has a high number of identity switches. Therefore, the author adds cascade matching and other functions on its basis, and proposes DeepSORT with better performance.

MOT based on joint of detection and tracking combines detection and tracking framework. This kind of algorithm generally detects the two adjacent frames of the video, and then uses different strategies to judge the similarity of the targets existing in the two frames at the same time, so as to track and predict. Typical algorithms include D&T [8], MOTDT [9], FairMOT [10], CenterTrack [11], etc.

MOT based on attention mechanism is to apply Transformer [12] to MOT. At present, there are mainly TransTrack [13] and TrackFormer [14]. TransTrack takes the feature map of the current frame as the Key, and takes the target feature Query of the previous frame and a group of target feature Query learned from the current frame as the input Query of the whole network.

## METHODOLOGY

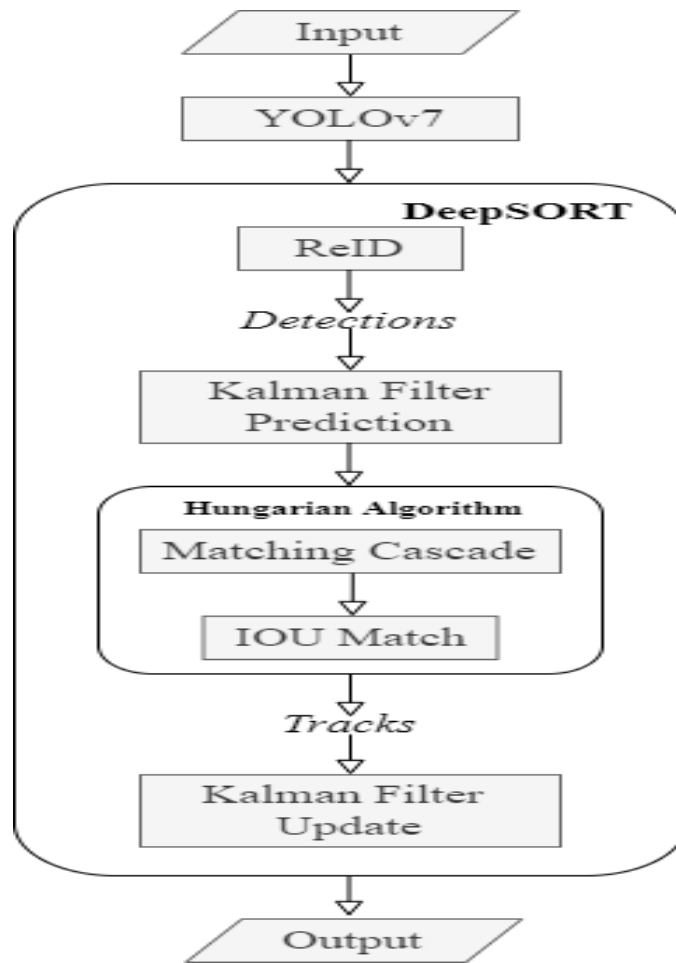


Fig. 1. The operation process of YOLOv7- DeepSORT. The input is sent to YOLOv7 to detect the targets. Then, ReID model requires a well distinguishing feature embedding from the output of YOLOv7. Kalman filter predicts the trajectory of each target. And the outputs of YOLOv7 and Kalman filter are sent to the Hungarian algorithm for matching to obtain the trajectory of the target.

### A. YOLOv7

YOLOv7 [15] is the latest work of YOLO series. This network further improves the detection speed and accuracy on the basis of the previous work. Specifically, in terms of the overall architecture, the paper proposes E-ELAN, uses expand, shuffle, merge cardinality to achieve the ability to continuously enhance the learning ability of the network without destroying the original gradient path. E-ELAN can guide different groups of computational blocks to learn diverse features. The paper also proposes a compound model scaling method to maintain the properties that the model had at the initial design and maintains the optimal structure. In terms of network optimization strategy, the paper introduces model re-parameterization and dynamic label assignment, analyzes their existing problems, and improves them. For the former, the author believes that because RepConv [16] has identity connection, direct access to the cascade of ResNet [17] or DenseNet [18] will provide more gradient diversity for different characteristic graphs, thus destroying the network structure.

Therefore, the author removed the identity connection in RepConv and designed the planned reparameterized convolution, realizing the efficient combination of re-parameterized convolution and different networks. For the latter, the paper uses the idea of Deep supervision [19] and adds an additional auxiliary head structure in the middle layer of the network as an auxiliary loss to guide the weight of the shallow network. A new label assignment method is designed for this structure.

## B. DeepSORT

SORT algorithm uses a simple Kalman filter to deal with the correlation of frame-by-frame data, and uses the Hungarian algorithm to measure the correlation. This algorithm has achieved good performance at high frame rate. However, since SORT ignores the appearance feature of the detected target, it will be accurate only when the uncertainty of target state estimation is low. In addition, in order to improve the tracking efficiency, SORT deletes the target that has not been matched in a continuous frame, but this causes the problem of ID switch, that is, the ID assigned to the target is easy to change constantly.

Therefore, DeepSORT adds appearance information and borrows ReID model to extract appearance features, reducing the number of ID switches by 45%. DeepSORT also turns SORT's matching mechanism based on IoU cost matrix into a mechanism of Matching Cascade and IoU matching. Specifically, the core idea of Matching Cascade is to give greater priority to track matching to the targets that appear more frequently in the long-term occluded targets. This method solves the matching problem of targets that have been occluded for a long time. DeepSORT performs IoU matching on unmatched tracks and detection targets in the final stage of matching, which can alleviate large changes caused by apparent mutations or partial occlusion. In addition, DeepSORT borrows the ReID model to require a well distinguishing feature embedding from the output of the object detection network for calculating the similarity.

## C. YOLOv7-DeepSORT

Considering the excellent performance of YOLOv7 in object detection tasks, we refer to YOLOv3-DeepSORT and replace YOLOv7 with the object detection model of the network to obtain YOLOv7-DeepSORT. The operation process of YOLOv7-DeepSORT is shown in Fig.1. The network trains YOLOv7 and ReID separately.

## EXPERIMENTS & RESULTS

In the experimental part, we evaluated the performance of YOLOv7-DeepSORT on the KITTI Road segment dataset from Kaggle and compared it with YOLOv3-DeepSORT. The parameters of the two in the DeepSORT part were set to be exactly the same. Among them, the models used in the object detection part are YOLOv7 and YOLOv3 both of which use the official pre-trained model.

The evaluation metrics used in the experiment are as follows:

MOTA [22]: Multi-Object Tracking Accuracy. This measure combines three error sources: false positives, missed targets and identity switches.

MOTP [22]: Multi-Object Tracking Precision: Summary of overall tracking precision in terms of bounding box overlap between ground-truth and reported location.

IDF1 [23]: ID F1 Score. The ratio of correctly identified detections over the average number of ground-truth and computed detections.

FP: The total number of false positives.

FN: The total number of false negatives (missed targets).

The results of the experiment are shown in Table 1.

TABLE I TRACKING RESULTS

MODE	YOLOv3	YOLOv7
MOTA	39.60	40.82
MOTP	80.85	82.01
IDF1	52.39	53.65
FP	5375	7940
FN	60882	57434

It can be seen from Table1 that YOLOv7-DeepSORT is higher than YOLOv3- DeepSORT in MOTA, MOTP and IDF1, so its tracking accuracy is indeed better. In general, YOLOv7-DeepSORT has significantly improved the tracking accuracy compared with YOLOv3-DeepSORT.

## CONCLUSION

We add YOLOv7 as object detection network to DeepSORT and get YOLOv7- DeepSORT. YOLOv7 is the new state-of-the-art object detector in the YOLO family. It is the fastest and most accurate real-time object detector to date. This network has better tracking accuracy than YOLOv3- DeepSORT. Thanks to the excellent generalization of YOLOv7 and DeepSORT, the YOLOv7-DeepSORT is also applicable to all kinds of target tracking tasks. Further with all these information of the instances and objects tracked in the given input data (video), it is feed into the machine to process the data and take necessary controls to be taken for navigating the self-driving cars.

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# Sentiment Analysis Using Flipkart Reviews

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## **ABSTRACT:**

*In today's era, social media has become a source of reviewing or rating a product. The objective of a sentimental analysis system in this domain is used to detect the opinions of different people. Reviewing a product are essential for both buyers and seller. This research explores the sentiment analysis based on the trained data. Our research focuses on mobile products in the marketing world. For experimentation, real time Twitter data and Flipkart data is used. Sentiment Analysis (SA) aims to identify the aspect of entities and sentiments expressed for each aspect. ML domain is embedded for our research in order to acquire accuracy. The performance of algorithm will be determined through this research using the proven technologies available in the world like Re-call, F-Measure and Accuracy.*

## **INTRODUCTION:**

Sentimental Analysis on Big Data or social media gain much focuses in recent years because much information closes on social media. But analysing this information still requires better research on social data. Sentiment Analysis (SA) is very crucial and very challenging because review writing style of the customers varies from person to person. Sentimental Analysis is also called mining. Opinion mining on review data can prove to be very beneficial for both the producers and the consumers. In review data sets, SA is preferred as instead of giving the overall sentiment it is more precise and biased towards the aspect in hand.

Recent years has seen rapid growth of research on sentiment analysis. Sentiment analysis has both business importance and academic interest. So far, most sentiment analysis research has focused on classifying the overall sentiment of a document into positive or negative. The prime objective of Sentiment Analysis is to identify, depending on the review data provided by the customer as they like or dislike it. A computer program really finds it as a challenging task in identifying the sentiment, since there are numerous aspects in predicting the sentiments, even though sentiment analysis aids in the process of identifying the sentiment hidden in the text reviews. For instance, it is much simple in analysing review text to make sense of affirmative (positive) sentiment than the negative sentiment. It also needs governing the intended 'aspect' of the statement that has named as the negative sentiment.

## **RELATED WORKS:**

In recent years, multimodal sentiment analysis has become a hot topic of current research. It is found that, there are affective regions that evoke human sentiment in an image, which are usually manifested by corresponding words in people's comments. An adaptive cross-modal gating module is used to fuse multimodal features so that the features of images and texts can be more adequately connected for the purpose of reliably predicting contextual information. A recent trend in research is unsupervised sentiment analysis methods for textual reviews. People express their opinions, views on exoskeleton technology through the Twitter web platform. Researchers have used the Twitter platform textual reviews to evaluate the effectiveness of exoskeleton technology

methods more effectively. In the unsupervised sentiment analysis approach, Latent Dirichlet allocation, along with linguistic rules, is used for aspect extraction. Sent WordNet lexicon is used for sentiment scoring and classification. Researchers have also proposed other algorithms and models to capture the mutual representations between aspects and contextual background.

#### METHODOLOGY:

The following represents the steps of sentiment analysis using machine learning techniques-based classification. Dataset is collected from Kaggle. The data collection process is the first stage in this step. In this stage, a freely available dataset will be used for pre-processing the data. The collected dataset serves as input to the pre-processing stage and further the feature selection or extraction method has been applied over it to classify the polarity into positive and negative statements.

The dataset consists of two columns

1. **REVIEW:** Reviews given by the customer
2. **RATING(target value):** Ratings given by the customer.



Pre-processing of selected dataset:

#### FEATURE EXTRACTION:

Feature extraction is a process of dimensionality reduction by which an initial set of raw data is reduced to more manageable groups for processing. A characteristic of these large data sets is a large number of variables that require a lot of computing resources to process. Feature extraction is the name for methods that select and / or combine variables into features, effectively reducing the amount of data that must be processed, while still accurately and completely describing the original dataset.

#### COUNT VECTORIZER:

Countvectorizer Tokenization (Tokenization Means Breaking Down a Sentence into Words) by Performing Preprocessing Tasks Like Converting All Words to Lowercase, Removing Special Characters, Etc. Countvectorizer is Imported from Sklearn Feature extraction Sklearn. feature extraction.text Countvectorizer.

Building Model:

## MACHINE LEARNING:

Machine Learning (ML) algorithms create models which are trained with the available data so as to predict or classify any unknown new input. These algorithms prove to provide results with higher accuracy. ML can be further categorized into mainly three levels viz. supervised learning, unsupervised learning and reinforcement learning. Under ML techniques, there are mainly two sets of data, namely training and test data. The training data is fed to a ML classifier for the training process. There are many classifiers like neural networks, Kmeans, SVM. Classifications and prediction based on evaluated semantics.

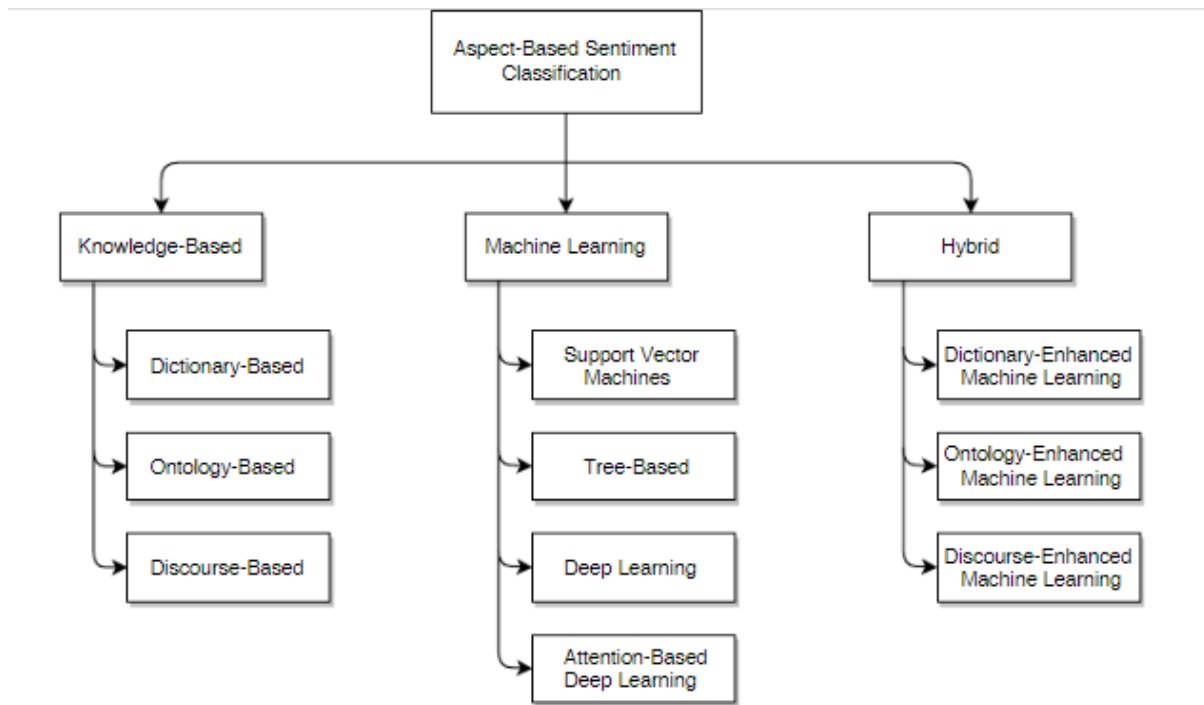
This chapter outlines the overall design of the proposed solution. It illustrates the general structure for the approach which has taken to tackle each of the sub-tasks of Sentiment Analysis (SA) system. This proposed system mainly develops using the machine learning techniques, which incorporated with natural language processing. The main aim of this research is to investigate and develop a methodology to facilitate supervised learning-based approach to sentiment analysis. This research is conducted exploring several related techniques used in opinion mining and sentiment analysis.

## MULTINOMIAL NB:

The multinomial Naive Bayes classifier is suitable for classification with discrete features (e.g., word counts for text classification). The Naive Bayesian method is a probabilistic learning method based on Bayes' theorem. There are several variants of this algorithm, but here we have used MNB algorithm. Multinomial Naive Bayes classification algorithm tends to be a baseline solution for sentiment analysis task. The basic idea of Naive Bayes technique is to find the probabilities of classes assigned to texts by using the joint probabilities of words and classes.

## RANDOM FOREST:

Random Forest classifier is a tree-based classifier. It comprises of multiple classification trees that can be used to estimate the class label. For a given information, every tree vote for a specific category label and also the category label gaining the most votes are going to be appointed thereto data point. The error rate of this classifier depends on the correlation or association among any 2 trees within the forest additionally to the strength of definite or individual tree within the forest. The sides effort a node area unit portrayed as tests on the feature's weight, and also the leaves area unit portrayed as category classes. The document is then classified within the class that labels of a single decision tree can learn quite complex functions. However, in many ways it can be prone to overfitting. To overcome this, we could create many decision trees and then ask each tree to predict the class value. We could take majority vote and use that answer as our overall prediction. Random forest work on this principle.



## EVALUATION AND RESULTS:

The analysis of algorithms and feature sets in text classification can be evaluated by several statistical measures such as recall, precision, accuracy  $\alpha$ , and in this study, we used the overall accuracy. Total accuracy is defined as the percentage of sentiments correctly predicted of total instances are to the number of true positive, false negative, number of false positive instances and the number of true negative instances. As the SA problem mainly focusses on the classification of words based on their sentiment polarity, evaluation of SA is done by the metrics - **Precision (P), Recall (R), F-score (F1) and Accuracy (Acc)**. The primary task of SA by both the lexicon-based and machine learning based approach is this classification task. The performance of the supervised machine learning classification problem is evaluated by using confusion matrix.

**True Positive (TP)** represents reviews are observed as positive and also predicted as positive by the classifier.

**True Negative (TN)** represents observed reviews are negative and also predicted as negative.

**False Positive (FP)** represents observed reviews are negative, but is predicted positive. **False Negative (FN)** represents observed reviews are positive, but is predicted as negative by the classifier.

**Accuracy** - It is essentially a proportion of accurately anticipated perception to the complete perceptions.

$$\text{Accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{FP} + \text{FN} + \text{TN}}$$

**Precision** - It is the proportion of accurately anticipated positive perceptions to the all-out anticipated positive perceptions.

$$\text{Precision} = \frac{\text{TP}}{\text{TP} + \text{FP}}$$

**Recall** - Recall is the ratio of number of true positive observations to the true positives plus false

negatives.

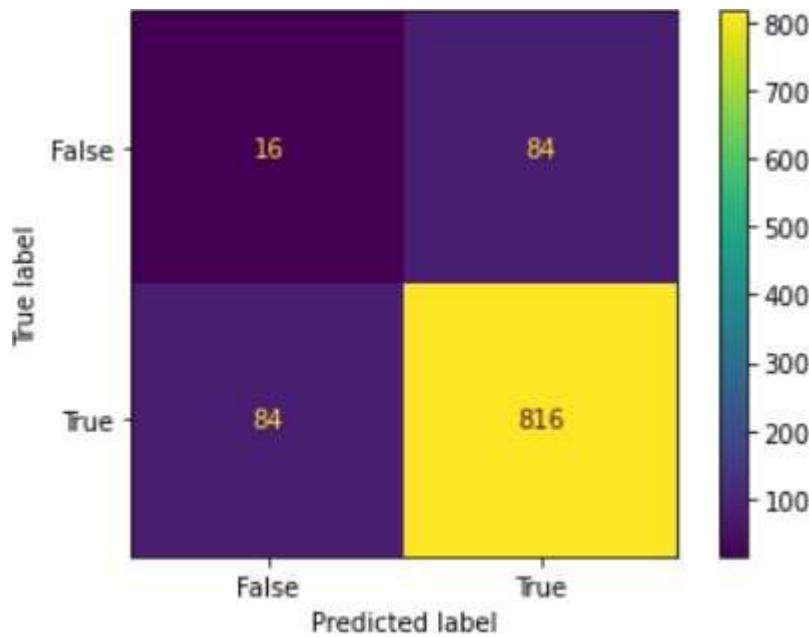
$$\text{Recall} = \text{TP} / (\text{TP} + \text{FN})$$

**F1 score** – It is the weighted average of Precision and Recall.

$$\text{F1 Score} = 2 * (\text{Recall} * \text{Precision}) / (\text{Recall} + \text{Precision})$$

		Actual Value (as confirmed by experiment)	
		positives	negatives
Predicted Value (predicted by the test)	positives	<b>TP</b> True Positive	<b>FP</b> False Positive
	negatives	<b>FN</b> False Negative	<b>TN</b> True Negative

<b>Precision</b>	0	0.95	0.98
	1	0.99	0.98
<b>Recall</b>	0	0.99	0.98
	1	0.96	0.98
<b>F1-Score</b>	0	0.97	0.98
	1	0.97	0.98
<b>Accuracy</b>		0.97	0.98



#### CHALLENGES:

SA, a fine-grained level has made its great influence in the current technology-oriented world in the past four to five years. It is clear that machine learning works are giving more promising results than others. ML has a great level of importance in different applications like analysing customer feedback. Many other domains like travel reviews, news, etc., that are having a high level of significance are still under untouched research areas. The active participation of usage of regional language in social media gave a significant level of importance to this area to have more researches in aspect level SA. Lack of good datasets in regional languages is also becoming a hindrance to further researches in this area.

#### FUTURE SCOPE:

The future of sentiment analysis is going to continue to dig deeper, far past the surface of the number of likes, comments and shares, and aim to reach, and truly understand, the significance of social media interactions and what they tell us about the consumers behind the screens. This forecast also predicts broader applications for sentiment analysis – brands will continue to leverage this tool, but it also insights the individuals in the public eye, governments, education centres and many other organizations. The field of sentiment analysis is an exciting new research direction due to large number of real-world applications where discovering people’s opinion is important in better decision-making.

The development of techniques for the document-level sentiment analysis is one of the significant components of this area. Recently, people have started expressing their opinions on the Web that increased the need of analysing the opinionated online content for various real-world applications. A lot of research is present in literature for detecting sentiment from the text. Still, there is a huge scope of improvement of these existing sentiment analysis models.

## **CONCLUSION:**

Aspect Based Sentiment Analysis focuses to go beyond a mere word level analysis of text and provide a more semantic analysis of text through the use of web on sources or semantic networks. This empowers novel approaches to sentiment analysis. In aspect-based sentiment analysis (ABSA) the aim is to identify the aspects. The vast amount of user generated info in the Web, necessitates accurate methods to analyse and specify user opinions and attitudes towards events, products and entities. In this work, we present a method for aspect-based sentiment analysis by using machine learning. The evaluation results show that the method is efficient and that the ML model performs robustly better than individual learners and can be used as a very viable approach for sentiment classification.

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# Impact of Covid-19 on the Performance of Emerging Stock Markets

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## **ABSTRACT**

*The stock markets are influenced by host of factors, one such factor is COVID-19 that has impacted much in terms of Performance among Emerging Countries. The main research purpose is to analyse impact of COVID-19 on selected Stock Markets. The very first objective is to analyse the Performance of Selected Emerging Stock Market based on risk and return. The second main objective is to examine the outbreak of COVID-19 on selected Countries and last objective is to examine the impact of outbreak of COVID-19 on the Performance of Selected Emerging Markets. The type of research used here is Descriptive in nature, the study sampling technique chosen is probability sampling and random sampling method. The various hypotheses designed to prove the set objectives by mentioning the tool and techniques used for the study. The results indicated stationary for all the data series used at level itself and negative correlation between new positive cases and death cases with the performance of all the selected emerging stock markets but insignificant. The researchers also witnessed the results of multiple regression that the non-existence of the statistical influence of COVID-19 on the performance of stock markets. Hence, the conclusions drawn that during the study period, COVID-19 has not created any effect on the selected stock markets.*

## **INTRODUCTION**

The Stock Market is one of the most important ways for companies to raise money, along with debt markets which are generally more imposing but do not trade publicly. This allows businesses to be publicly traded, and raise additional financial capital for expansion by selling shares of ownership of the company in a public market. The liquidity that an exchange affords the investors enables their holders to quickly and easily sell securities. This is an attractive feature of investing in stocks, compared to other less liquid investments such as property and other immovable assets.

History has shown that the price of stocks and other assets is an important part of the dynamics of economic activity and can influence or be an indicator of social mood. An economy where the stock market is on the rise is considered an up-and-coming economy. The stock market is often considered the primary indicator of a country's economic strength and development.

Rising share prices, for instance, tend to be associated with increased business investment and vice versa. Share prices also affect the wealth of households and their consumption. Therefore, central banks tend to keep an eye on the control and behavior of the stock market and, in general, on the smooth operation of financial system functions. Financial stability is the *raison d'être* of central banks.

Exchanges also act as the clearinghouse for each transaction, meaning that they collect and deliver the shares, and guarantee payment to the seller of a security. This eliminates the risk to an individual buyer or seller that the counterparty could default on the transaction.

The smooth functioning of all these activities facilitates economic growth in that lower costs and



enterprise risks promote the production of goods and services as well as possibly employment. In this way, the financial system is assumed to contribute to increased prosperity, although some controversy exists as to whether the optimal financial system is bank-based or market-based.

Recent events such as the Global Financial Crisis have prompted a heightened degree of scrutiny of the impact of the structure of stock markets, in particular to the stability of the financial system and the transmission of systemic risk.

## REVIEW OF LITERATURE

The Impact of COVID-19 on the Financial Market as well as the Stock Market has been subject to many empirical studies both in advanced and Emerging Economies. Existing literature found diverse results in these regards. This chapters aims to reviewing the previous studies related to subject matter of the research.

**William Arthur Thomas (2021)** stated that further loosens its capital controls - retrieved on January 2021. *Western Capitalism in China history of the Shanghai Stock Exchange*. Aldershot Ashgate. He stated that impact of COVI-19 on the China Stock Market and the share market. The study was conducted on the period of Jan 2020 to Dec 2021.

**Albulescu (2020)** documented that new confirmed cases of COVID-19 and death reported positively influence market volatility index both within and outside of China. Additionally, he proposed that the higher the spread of the deadly virus in the country, the higher would be the financial volatility in the stock market. In the context of Spanish capital markets.

**Liu et al. (2020)** investigated the impact of the COVID-19 outbreak on the most affected countries' stock markets using the event study method. They documented that the stock markets responded negatively to the COVID-19 outbreak, which had weakened their performance.

**Lukasiecz (2020)** conducted research on effectiveness of stocks in pandemic period Foreigners allowed to List on Shanghai Stock Exchange retrieved on January 21, 2009, *International Herald Tribune*.

**Ahmar and Val (2020)** predicted a short-term effect of COVID-19 on the IBEX index using the ARIMA and Sutte ARIMA methodology. Based on the results, they suggested that Sutte ARIMA is better for predicting the impact of the corona virus on the stock market than ARIMA.

**Acemoglu et al. (2020)** considered a multi-risk SIR model by focusing on the structural differences in the severity of infections for distinct age groups that affect lockdown policies and economic costs. They show that targeted measures such as full lockdown for the elder group could be more effective.

**Alon et al. (2020)** considered a closed economy model but approach the problem from the developing country perspective, considering market distortions and the presence of an informal sector and hand to mouth consumers. They realize that such economies cannot fully lockdown and argue that lockdowns on the elderly population might be better.

**Ozili and Arun (2020)** have conducted an empirical study on the effect of social distancing policy that was adopted to prevent the spread of the Corona Virus, based on four continents. They documented that global markets have become highly volatile and financial market risk has increased in response to the uncertainty of market conditions.

**Azimili (2020)** conducted research on understanding the impact of corona virus on the degree and structure of risk-return dependence in the US by using quintile regression. The results indicate that following the COVID-19 outbreak the degree of dependence between returns and market portfolio has raised in the higher quintiles that lowering the benefits of diversification.

**Cepoi (2020)** conducted research on the relationship between COVID-19 related news and stock

market returns across the topmost affected countries. By employing a panel quintile regression this study found that the stock market presents asymmetry 5 dependence on COVID- 19 related information.

**Zhang et al. (2020)** measured the general pattern of country-specific risk and systematic risk across world financial markets in the presence of COVID-19 outbreak fear. They documented that global markets have become highly volatile and financial market risk has increased in response to the uncertainty of market conditions. In the case of they suggested that non-conventional policy interventions (quantitative easing) could increase more problems for the economy. Regarding the impact of the deadly virus on financial volatility.

**Lukasiewicz and Mariusz (2020)** conducted research on the study of COVID-19 impact on Emerging Stock Markets “From his study the market of the Johannesburg Stock Exchange accrued some loses, Journal of Southern African Studies.

**Herald Kinateder et.al (2019)** were conducted the research on revisiting daily effects in South Africa, the objective of the study is dummy approach to analyze the influencing daily effects on stock markets returns significant pre and post daily effects, south Africa market is affected after daily returns only and Chinese market is anomalies before public daily return.

**Satish Kumar (2019)** was conducted studies on A review of the evolution of daily effects, the studies purpose to providing a detailed analysis of daily effects in the area of stock market and currency market, the positive returns and daily returns were stronger during the 1980-90 and have gradually diminished in the recent time which indicates that the market have achieved a longer degree of efficiency.

**Jihen Jbenieni Gouider et.al (2018)** aimed to analyse the effect of financial market anomalies, specifically daily effects on the behavior of financial investor in term of decision and profit, used secondary data like daily data consisting Russian stock market index closing price during 1-year period and used GARCH model, they result show high volatility and low stock return.

There are various literatures available on the impact of COVID-19 on different sectors such as health, agriculture, industry, trade, and commerce but a limited specific study has been conducted on its impact on the stock market of the emerging economy. The Stock market plays an important role in the economy. As India is one of the important parts of the emerging economy, this paper through light to study the impact of COVID-19 on the Indian stock market.

## RESEARCH GAPS

The following are Research Gaps that have been identified through literature survey

1. The study endeavors to investigate the link that exists, NSE Stock Market, SSE Stock Market, JSE Stock Market, MBV Stock Market and MOSCOW Stock Market.
2. Most of the study concentrate on the monthly effects and weekly effects on stock markets, does not using daily effects on stock markets.
3. Most of the research’s focused on only developed counties.

## PROBLEM STATEMENT

The impact of COVID-19 on selected Emerging Stock Markets with the rising inflation people have less to spend and have lesser savings because of rising prices. The investments in the Stock Market also go downhill because the investors have fewer cash holdings. The study endeavors to investigate the link that exists, NSE Stock Exchange, SSE Stock Exchange, JSE Stock Exchange, BMV Stock Exchange and Moscow Stock Exchange. This study investigates the COVID-19

impact, whether COVID-19 shaping Exchange rates and Stock Markets. The research venues may explore how the COVID-19 incident affects different Stock Exchange.

There is no study done in this area, as a majority researches concentrated on the effectiveness of the stock markets during the pandemic. But the above the study is understanding to compare the selected stock markets performance analysis for forecasting.

## **RESEARCH OBJECTIVES**

The following are the Objectives set for the Research study

1. To Analyse the Performance of Selected Emerging Stock Market.
2. To Examine the Outbreak of COVID – 19 on Selected Emerging Countries
3. To Examine the Impact of Outbreak of COVID – 19 on the Performance of Selected Emerging Stock Markets.
- 4.

## **RESEARCH DESIGN AND METHODOLOGY**

The following information is related to research Methodology, which is used in this research.

Research Type

The type of Research is Descriptive in nature.

Research Hypotheses

The following are set for the hypotheses

Null Hypothesis

H0 - The data series is not stationary.

H0 - There is no significant relationship between COVID-19 New & Death cases and Emerging Stock Markets.

H0 - There is no significant impact of COVID-19 New & Death cases and Emerging Stock Markets.

Alternative Hypothesis

H1 - The data series is stationary.

H1 - There is a significant relationship between COVID-19 New & Death cases and Emerging Stock Markets.

H1 - There is a significant impact of COVID-19 New & Death cases and Emerging Stock Markets.

Sampling Design Sampling Technique

The Probability Sampling technique is used in the study as we have selected Emerging Stock Market.

Sampling Method

The Random Sampling method is used to select the COVID-19 Emerging Stock Market.

Sample Size

For the study, Researchers chose five Emerging Stock Markets.

## Data

Secondary Data is used for analyse the relation between the COVID-19 New cases and Death and Emerging Stock Markets.

- Data collected from various books and websites.
- Publications and internet.

## Statistical Tests used

**1. Stationarity analysis:** In statistics, a unit root test whether a time series variable is non-stationarity possesses a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is stationarity, trend stationarity or explosive depending on the test used.

**2. Descriptive analysis:** The descriptive statistics is summary statistics that quantitatively describes or summarize features from a correlation of information, while descriptive statistics is the collection of using and analyzing those statistics.

**3. Correlation analysis:** Correlation is a statistical term describing the degree to which two variable moves in coordinating with one-another. If the two-variable move in the same direction. Then those variables are said to have a position correlation.

**4. OLS Regression:** OLS Regression is also called linear Regression. It's a linear approach to modeling the relationship between a scalar response (or depended variable) and one or more explanatory variables (or independent variables).

## Research Limitations

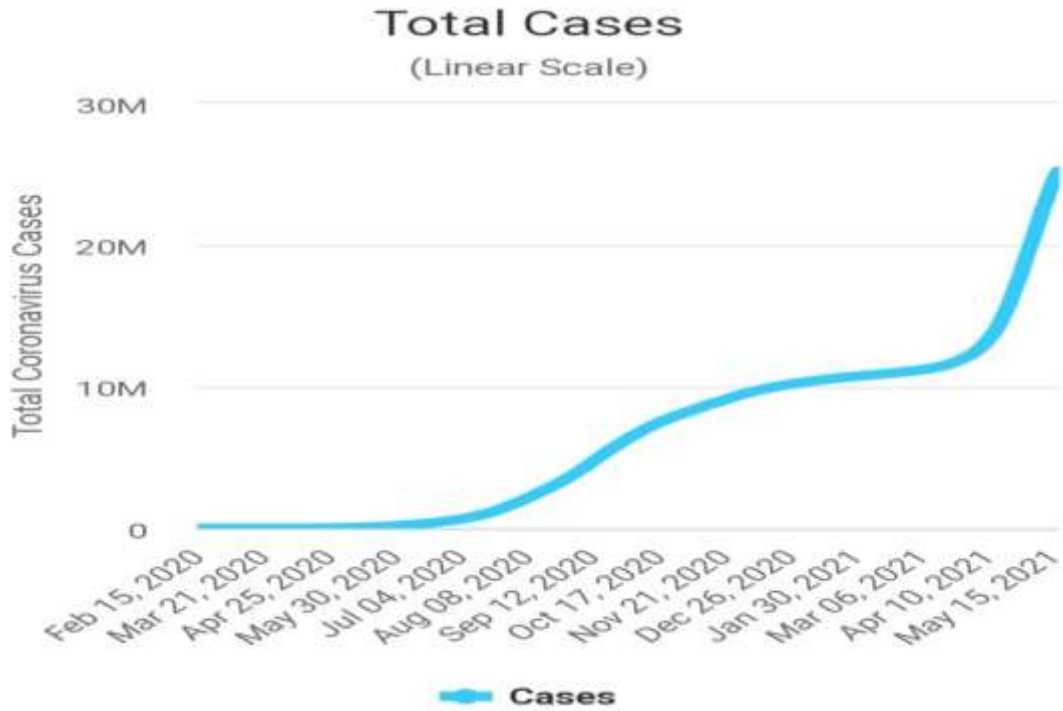
1. The study is restricted to selected Emerging Stock Markets.
2. Limited time available to conduct the study on Emerging Countries.
3. The data used in the study from Jan 2020 to April 2021.

## RESULTS AND DISCUSSION

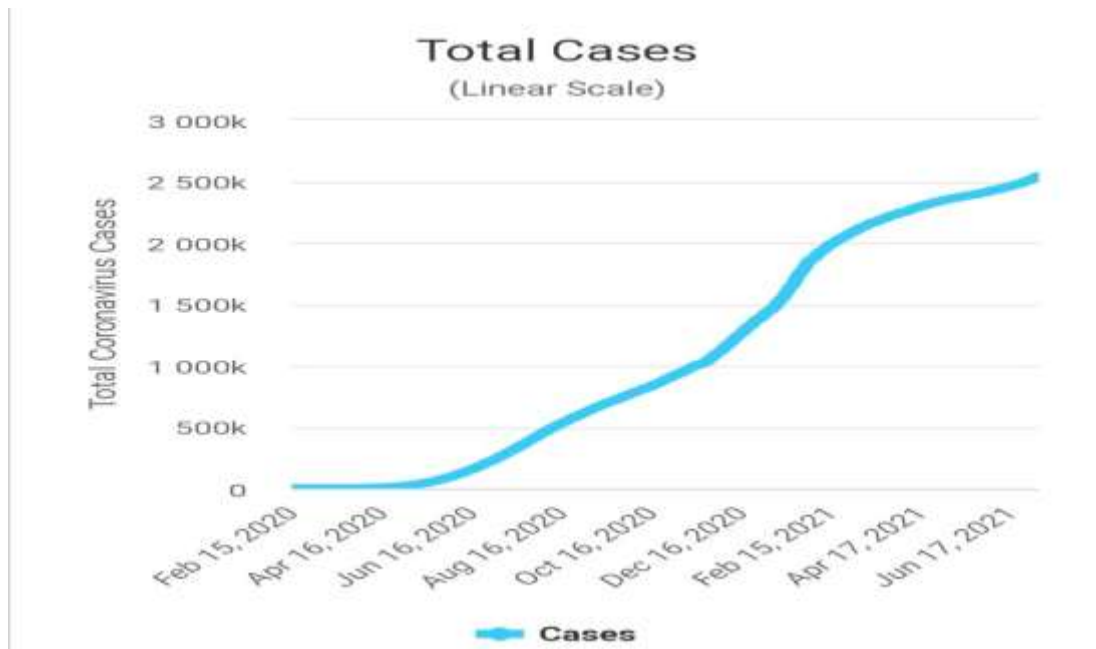
### Data

The data related to stock markets is collected from yahoo finance.com, and moneycontrol.com, The historical data of five selected countries Stock exchanges the likes of NSE Stock Exchange, SSE Stock Exchange, BMV Stock Exchange, JSE Stock Exchange and MOSCOW Stock Exchange index has been collected for the period of 1 year (1-4-2020 to 31-3-2021). The covid- 19 data was sourced from the respective countries bulletin.

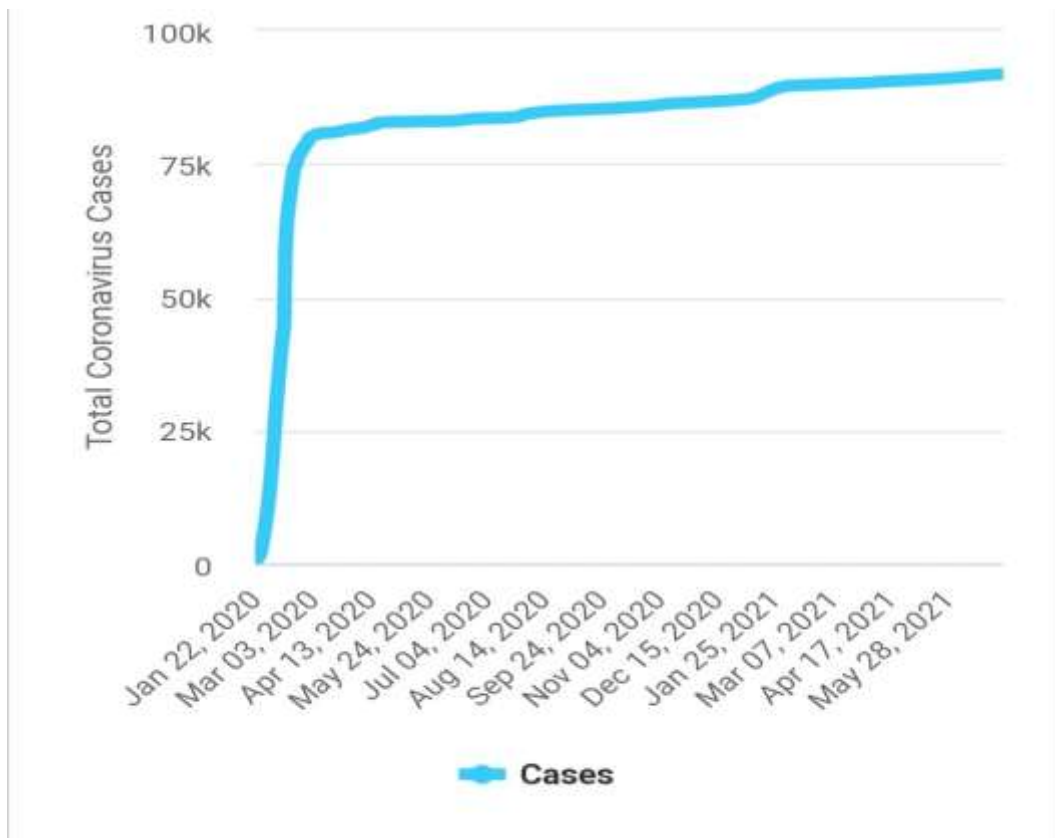
**Figure 1 - Showing the Total COVID-19 Cases in INDIA**



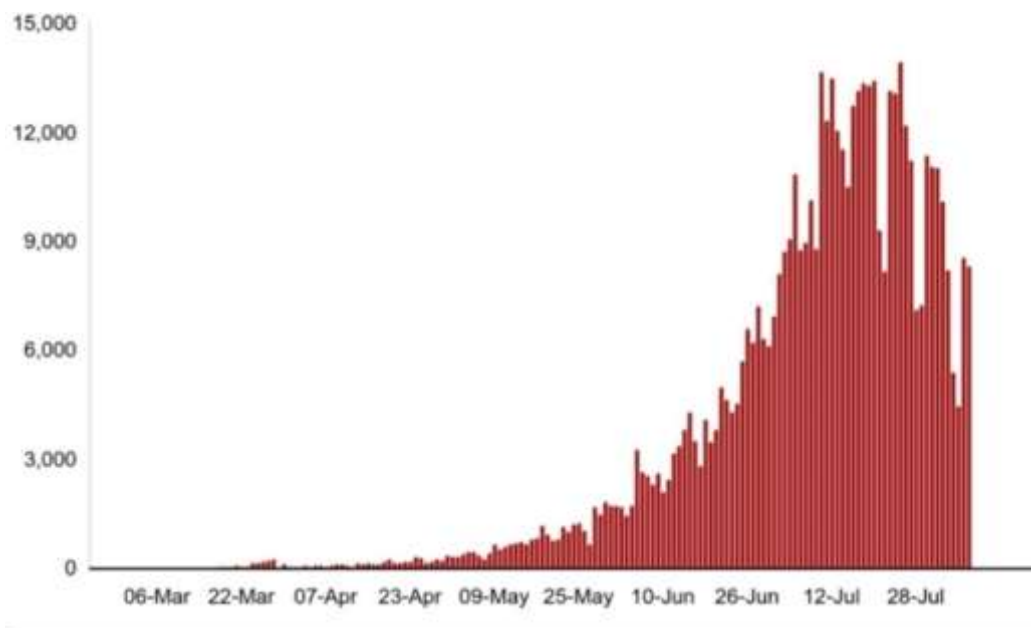
**Figure 2 – Showing the Total COVID-19 Cases MEXICO**



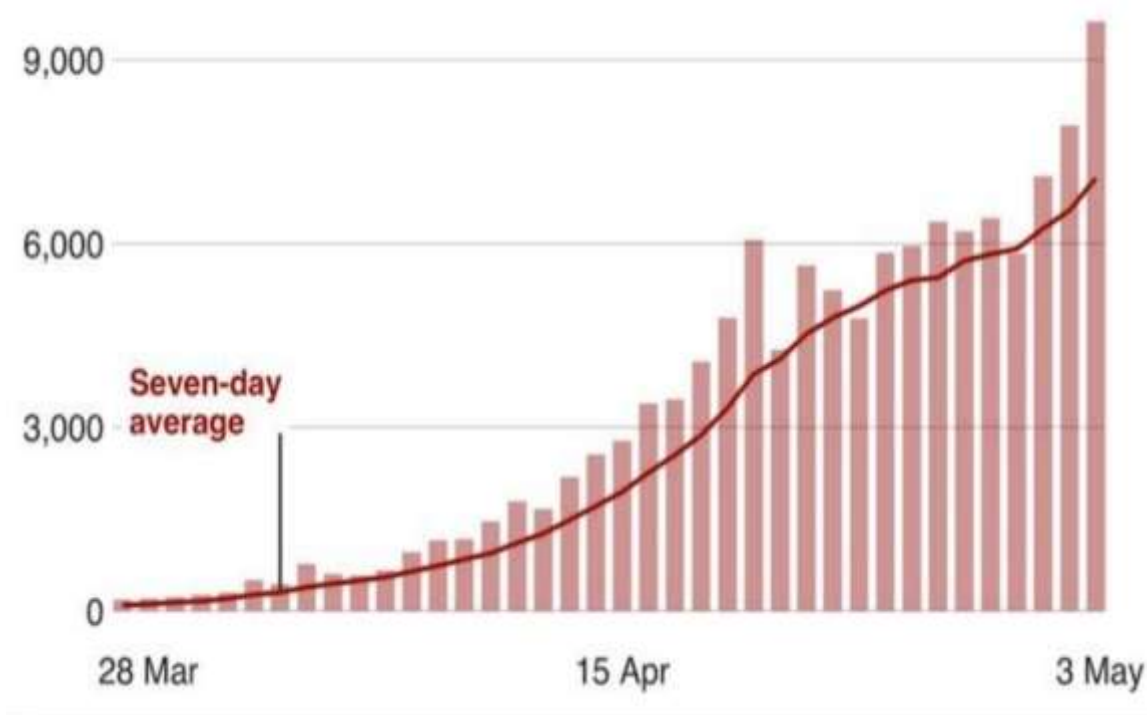
**Figure 3 – Showing the Total COVID-19 Cases in CHINA**



**Figure 4 – Showing the Total COVID cases in SOUTH AFRICA**



**Figure 5 – Showing the Total COVID 19 Cases in RUSSIA**



**Analysing the Performance of Emerging Stock Market**

H0 - The daily returns of selected indices are non-stationary. H1 - The daily returns of selected indices are non-stationary.

Table 1 - Showing Stationarity test Results for Stock Market Indices

Variables	Augmented Dickey-Fuller Unit Root Test
	‘P’ value
<b>NSE Nifty Return</b>	0.000
<b>SSE Return</b>	0.000
<b>Mexico Return</b>	0.000
<b>JSE Return</b>	0.000
<b>Moscow Return</b>	0.000

Empirical research in stock market based on time series data. In addition, the Stationary of a data series is a prerequisite for drawing meaningful inference in a time series analysis and to enhance the accuracy and reliability of the model constructed. If the variable is not stationary means, there is no meaningful relationship between the variables. One of the common methods to find whether a time series is stationary or not is the unit root test. One of the most popular among them is the Augment Dickey-Fuller test. According to ADF unit root test the data series

has no unit root means it is stationary. If the selected data series is, stationary means P-value must

be less than 0.05, if it is more than 0.05 means the data series is non-stationary. In this test NSE (0.00), SSE (0.00), BMV (0.00), JSE (0.00) and MOSCOW is (0.00C). All the selected stock markets are showing the non-Stationary.

Table 2 - Showing the Results of daily Effects on Selected Emerging Stock Market Returns

<b>Descriptive Statistics</b>	<b>NSE Nifty</b>	<b>SSE Mega Cap</b>	<b>BMV IPS 50</b>	<b>JSE SENS</b>	<b>MOSCOW MOEX</b>
Mean	-0.83	0.04	0.06	0.32	0.17
Standard Error	0.53	0.14	0.15	0.13	0.1
Median	0.21	0.11	0.15	0.28	0.08
Mode	-	-	-	-	-
Standard Deviation	9.69	2.49	2.72	2.27	1.81
Sample Variance	93.86	6.18	7.38	5.16	3.29
Kurtosis	98.93	6	15.16	4.62	3.55
Skewness	-9.84	-0.23	1.5	-0.39	0.05
Range	108.76	25.1	33.3	19.75	17.74
Minimum	-100	-11.81	-11.72	-11.78	-8.5
Maximum	8.76	13.29	21.58	7.97	9.24
Sum	-274.47	13.78	18.18	106.25	55.53
Count	330	330	330	330	330

The above table and figure present a summary of descriptive statistics of MOSCOW Stock Exchange. The table shows the value of Mean, Standard Error, Median, Mode, and Standard Deviation, sample Variance, Kurtosis, Skewness, Range, Minimum, Maximum, Sum and Count for the MOSCOW daily returns.

Value for descriptive statistic Mean, Standard Error, Median, SD, Sample Variance, Kurtosis, Skewness, Range, Minimum, Maximum, Sum and Count for five countries daily stock return. The descriptive statistics are brief descriptive coefficient that summarizes a given data set, which can be either a representation of the entire or a sample of population. Descriptive statistics are broken down into measurement of central tendency and measures of variability. The proposition of total variance in the dependent variable (five Emerging Countries daily returns) can be explained by independent variable. Using variance statistics, we determine the kurtosis and Skewness tests that confirm the significance of descriptive analysis. The very low- level significance kurtosis confirms significance analysed relationship. The kurtosis shows that SSE Mega Cap (China), BMV IPS 50 (Mexico), JSE SENS (South Africa), MOSCOW MOEX

(Russia) is in the level if Negative significance then the NSE Nifty (India), shows that Positive significance.

The Skewness is high and low that measure is showing the positive significance then Indian Stock Exchange and Mexico Stock Exchange they showing the negative significance. NSE and JSE are not significant for analysis the stock return exchange.



Analysing the Outbreak of Covid-19 in Emerging Countries Table 3 –

Showing Descriptive Statistics for COVID New Cases

<b>Covid-19 New Cases in Emerging Countries</b>					
<b>Descriptive Statistics</b>	<b>Indian New Cases</b>	<b>South Africa New Cases</b>	<b>Mexico New Cases</b>	<b>Russia New Cases</b>	<b>China New Cases</b>
Mean	4408942.608	3994605.876	5406559.961	5142017.536	4942883.585
Standard Error	257597.1299	240203.6204	243145.1178	236460.6061	265462.6835
Median	2363137.5	1540786	5021981.5	4479040.5	3811464.5
Mode	0	0	0	0	0
Standard Deviation	4506109.419	4201847.267	4253302.455	4136371.257	4643700.412
Sample Variance	0.000	0.000	0.000	0.000	0.000
Kurtosis	- 1.618486562	-1.363238392	-1.474590798	- 1.413920277	- 1.703597107
Skewness	0.362687099	0.578130242	0.046632482	0.142126508	0.201218647
Range	11646081	11139516	12686049	12149335	12589067
Minimum	0	0	0	0	0
Maximum	11646081	11139516	12686049	12149335	12589067
Sum	1349136438	1222349398	1654407348	1573457366	1512522377
Count	306	306	306	306	306

The above table value for descriptive statistic Mean, Standard Error, Median, SD, Sample Variance, Kurtosis, Skewness, Range, Minimum, Maximum, Sum and Count for five countries daily stock return. The descriptive statistics are brief descriptive coefficient that summarizes a given data set, which can be either a representation of the entire or a sample of population. Descriptive statistics are broken down into measurement of central tendency and measures of variability. The proposition of total variance in the dependent variable (five Emerging Countries daily returns) can be explained by independent variable. Using variance statistics, we determine the kurtosis and Skewness tests that confirm the significance of descriptive analysis.

Table 4 - Showing Descriptive Statistics for COVID Death Cases

<b>Covid-19 Death Cases in Emerging Counties</b>					
<b>Descriptive Statistics</b>	<b>Indian Death Cases</b>	<b>South Africa Death Cases</b>	<b>Mexico Death Cases</b>	<b>Russia Death Cases</b>	<b>China Death Cases</b>
Mean	66908.0915	56181.52941	60908.44771	60218.45425	74225.03595
Standard Error	3679.969641	3611.932949	4076.257759	3854.327711	3742.200013
Median	46562	17617	968	13101	65810.5
Mode	0	0	0	0	0
Standard Deviation	64373.17785	63183.02183	71305.38871	67423.19841	65461.76477
Sample	4143906027	3992094247	5084458458	4545887684	4285242647

Variance					
Kurtosis	-1.553625581	-1.499470138	-1.705663068	-1.68811384	-1.643933033
Skewness	0.305520057	0.521710199	0.39851386	0.415455829	0.134206885
Range	238648	157346	238648	162468	238648
Minimum	0	0	0	0	0
Maximum	238648	157346	238648	162468	238648
Sum	20473876	17191548	18637985	18426847	22712861
Count	306	306	306	306	306

Value for descriptive statistic Mean, Standard Error, Median, SD, Sample Variance, Kurtosis, Skewness, Range, Minimum, Maximum, Sum and Count for five counties daily stock return. The descriptive statistics are brief descriptive coefficient that summarizes a given data set, which can be either a representation of the entire or a sample of population. Descriptive statistics are broken down into measurement of central tendency and measures of variability. The proposition of total variance in the dependent variable (five Emerging Countries daily returns) can be explained by independent variable. Using variance statistics, we determine the kurtosis and Skewness tests that confirm the significance of descriptive analysis. The very low- level significance kurtosis confirms significance analyzed relationship. The kurtosis shows that NSE Nifty (India), BMV IPS 50 (Mexico), JSE SENS (South Africa), MOSCOW MOEX (Russia) is in the level if Negative significance then the SSE Mega Cap (CHINA), shows that Positive significance.

Descriptive statistics test effects on selected index using in different indices of different countries daily returns. The above tables show the value if Mean, Standard Error, Median, Mode and Standard Deviation, Sample Variance, Kurtosis, Skewness, Range, Minimum, Maximum, Sum and count for the selected Indies daily return.

Impact Of Outbreak of Covid-19 On the Performance of Selected Emerging Stock Markets.

**H0** - There is no Significant Relationship between COVID-19 New and New Cases and Emerging Stock Market Performance.

**H1** - There is a Significant Relationship between COVID-19 New and New Cases and Emerging Stock Market Performance.

Table 5 - Showing Correlation Test Results for NSE Nifty

<b>CORRELATION</b>				
		<b>Indian New Cases</b>	<b>Indian Death Cases</b>	<b>NSE Nifty</b>
<b>Indian New Cases</b>	Pearson Correlation	1	.992**	-0.077
	Sig. (2-tailed)		0.000	0.178
	N	306	306	306
<b>Indian Death Cases</b>	Pearson Correlation	.992**	1	-0.074
	Sig. (2-tailed)	0.000		0.196
	N	306	306	306

<b>NSE Nifty</b>	Pearson Correlation	-0.077	-0.074	1
	Sig. (2-tailed)	0.178	0.196	
	N	306	306	306
**. Correlation is significant at the 0.01 level (2-tailed).				

The above results reveal the correlation results between NSE Nifty daily returns and Covid-19 daily new cases and daily death cases. The correction between NSE Nifty daily returns and Covid-19 daily new cases is -0.077 and insignificant at 5% level as p-value is 0.178, hence, null hypothesis is not rejected.

The correction between NSE Nifty daily returns and Covid-19 daily new death cases is -0.074 and insignificant at 5% level as p-value is 0.196, hence, null hypothesis is not rejected.

The analysis clearly indicates that there is no existence of correlation between NSE Nifty daily returns and Covid-19 daily new cases and daily death cases.

Table 6 – Showing Correlation Test Results for SSE Mega Cap

<b>CORRELATION</b>				
		<b>China New Cases</b>	<b>China Death Cases</b>	<b>SSE Mega Cap</b>
<b>China New Cases</b>	Pearson Correlation	1	.992**	0.022
	Sig. (2-tailed)		0.000	0.705
	N	306	306	306
<b>China Death Cases</b>	Pearson Correlation	.992**	1	0.023
	Sig. (2-tailed)	0.000		0.693
	N	306	306	306
<b>SSE Mega Cap</b>	Pearson Correlation	0.022	0.023	1
	Sig. (2-tailed)	0.705	0.693	
	N	306	306	306
**. Correlation is significant at the 0.01 level (2-tailed).				

The above results reveal the correlation results between SSE Mega Cap daily returns and Covid-19 daily new cases and daily death cases. The correction between SSE Mega Cap daily returns and Covid-19 daily new cases is 0.022 and insignificant at 5% level as p-value is 0.705, hence, null hypothesis is not rejected.

The correction between SSE Mega Cap daily returns and Covid-19 daily new death cases is 0.023 and insignificant at 5% level as p-value is 0.693, hence, null hypothesis is not rejected.

The analysis clearly indicates that there is no existence of correlation between SSE Mega Cap daily returns and Covid-19 daily new cases and daily death cases.

Table 7 – Showing Correlation Test Results for MBV IPS 50

<b>CORRELATION</b>
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		<b>Mexico New Cases</b>	<b>Mexico Death Cases</b>	<b>BMV IPS 50</b>
<b>Mexico New Cases</b>	Pearson Correlation	1	.913**	-0.025
	Sig. (2-Tailed)		0.000	0.669
	N	306	306	306
<b>Mexico Death Cases</b>	Pearson Correlation	.913**	1	-0.030
	Sig. (2-Tailed)	0.000		0.597
	N	306	306	306
<b>BMV IPS 50</b>	Pearson Correlation	-0.025	-0.030	1
	Sig. (2-Tailed)	0.669	0.597	
	N	306	306	306
**. Correlation Is Significant at the 0.01 Level (2-Tailed).				

The above results reveal the correlation results between BMV IPS 50 daily returns and Covid- 19 daily new cases and daily death cases. The correction between BMV IPS 50 daily returns and Covid-19 daily new cases is -0.025 and insignificant at 5% level as p-value is 0.669, hence, null hypothesis is not rejected.

The correction between BMV IPS 50 daily returns and Covid-19 daily new death cases is - 0.030 and insignificant at 5% level as p-value is 0.597, hence, null hypothesis is not rejected.

The analysis clearly indicates that there is no existence of correlation between BMV IPS 50 daily returns and Covid-19 daily new cases and daily death cases.

Table 8- Showing Correlation Test Results for JSE SENS

<b>CORRELATION</b>				
		<b>South Africa New Cases</b>	<b>South Africa Death Cases</b>	<b>JSE SENS</b>
<b>South Africa New Cases</b>	Pearson Correlation	1	.982**	0.006
	Sig. (2-Tailed)		0.000	0.923
	N	306	306	306
<b>South Africa Death Cases</b>	Pearson Correlation	.982**	1	0.000
	Sig. (2-Tailed)	0.000		0.999
	N	306	306	306
<b>JSE SENS</b>	Pearson Correlation	0.006	0.000	1
	Sig. (2-Tailed)	0.923	0.999	
	N	306	306	306
**. Correlation Is Significant at the 0.01 Level (2-Tailed).				

The above results reveal the correlation results between JSE SENS daily returns and Covid-19 daily new cases and daily death cases. The correction between JSE SENS daily returns and Covid-19 daily new cases is 0.006 and insignificant at 5% level as p-value is 0.923, hence, null hypothesis is not rejected.

The correction between JSE SENS daily returns and Covid-19 daily new death cases is 0.000 and insignificant at 5% level as p-value is 0.999, hence, null hypothesis is not rejected.

The analysis clearly indicates that there is no existence of correlation between JSE SENS daily returns and Covid-19 daily new cases and daily death cases.

Table 9 - Showing Correlation Test Results for MOSCOW MOEX

<b>CORRELATION</b>				
		<b>Russia New Cases</b>	<b>Russia Death Cases</b>	<b>MOSCOW MOEX</b>
<b>Russia New Cases</b>	Pearson Correlation	1	.910**	0.006
	Sig. (2-Tailed)		0.000	0.915
	N	306	306	306
<b>Russia Death Cases</b>	Pearson Correlation	.910**	1	-0.017
	Sig. (2-Tailed)	0.000		0.762
	N	306	306	306
<b>MOSCOW MOEX</b>	Pearson Correlation	0.006	-0.017	1
	Sig. (2-Tailed)	0.915	0.762	
	N	306	306	306

\*\* . Correlation Is Significant at the 0.01 Level (2-Tailed).

The above results reveal the correlation results between MOSCOW MOEX daily returns and Covid-19 daily new cases and daily death cases. The correction between MOSCOW MOEX daily returns and Covid-19 daily new cases is 0.006 and insignificant at 5% level as p-value is 0.915, hence, null hypothesis is not rejected.

The correction between MOSCOW MOEX daily returns and Covid-19 daily new death cases is 0.017 and insignificant at 5% level as p-value is 0.762, hence, null hypothesis is not rejected.

The analysis clearly indicates that there is no existence of correlation between MOSCOW MOEX daily returns and Covid-19 daily new cases and daily death cases.

**Multiple Regression Analysis**

**H0** - There is no Significant Impact of COVID-19 New and Death Case on Emerging Stock Market Performance.

**H1** - There is a Significant Impact of COVID-19 New and Death Case on Emerging Stock Market Performance.

Table 10 - Showing the Results of Multiple Regression for NSE Nifty Daily Returns and Covid-19 Daily New Cases and Death Cases in India

<b>Variable</b>	<b>Coefficient</b>	<b>t-Stat. Value</b>	<b>P-Value</b>
Constant	0.091	0.3195	0.7496
Covid-19 Death Cases	0.000	0.0000	0.7355
Covid-19 New Cases	0.000	0.1348	0.8929
<b>Summary</b>			
Mean Dependent Var	0.023922	S.D. Dependent Var	2.54937
Sum Squared Resid	1981.212	S.E. of Regression	2.55708
<b>R-Squared</b>	<b>0.000543</b>	Adjusted R-Squared	-0.0061

<b>F (2, 303)</b>	<b>0.082327</b>	<b>P-Value (F)</b>	<b>0.92099</b>
Log-Likelihood	-719.9807	Akaike Criterion	1445.96
Schwarz Criterion	1457.132	Hannan-Quinn	1450.43

The above table showing the results of Multiple Regression for NSE Nifty Daily Returns and Covid-19 Daily New Cases and Death Cases in India. The Covid-19 Daily New Cases and Death Cases are independent variables and NSE Nifty Daily Returns is dependent variable. The results show that the regression model does not good fit the data as F-test's p-value is greater than 0.05 and the model r-squared is 0.00. When looked at the independent variables coefficients, it is found that both the independent variables insignificant at 5% level, hence, the null hypothesis of no significant Impact of COVID-19 New and Death Case on the daily returns of NSE Nifty is not rejected.

Table 11 - Showing the Multiple Regression for SSE Mega Cap Daily Returns and Covid- 19 Daily New Cases and Death Cases in China

Variable	Coefficient	t-Stat. Value	P-Value
Constant	-0.048	0.2316	0.8354
China Death Cases	0.000	0.000	0.8833
China New Cases	0.000	0.000	0.9225
<b>Summary</b>			
Mean dependent var	0.0497	S.D. dependent var	2.3796
Sum squared Resid	3279.497	S.E. of Regression	2.9753
<b>R-Squared</b>	<b>0.00078</b>	Adjusted R-Squared	-0.00709
<b>F (2, 303)</b>	<b>0.09745</b>	<b>P-value(F)</b>	<b>0.89579</b>
Log-likelihood	-813.279	Akaike criterion	2547.537
Schwarz criterion	2486.982	Hannan-Quinn	2379.973

The above table showing the results of Multiple Regression for SSE Mega Cap Daily Returns and Covid-19 Daily New Cases and Death Cases in China. The Covid-19 Daily New Cases and Death Cases are independent variables and SSE Mega Cap Daily Returns is dependent variable. The results show that the regression model does not good fit the data as F-test's p- value is greater than 0.05 and the model r-squared is 0.00. When looked at the independent variables coefficients, it is found that both the independent variables insignificant at 5% level, hence, the null hypothesis of no significant Impact of COVID-19 New and Death Case on the daily returns of SSE Mega Cap is not rejected.

Table 12 - Showing the Multiple Regression for BMV IPC 50 Daily Returns and Covid- 19 Daily New Cases and Death Cases in Mexico

Variable	Coefficient	t-Stat. Value	P-Value
Constant	0.0911	0.2854	0.7496
Mexico Death Cases	0.000	0.000	0.7355
Mexico New Cases	0.000	0.000	0.8929
<b>Summary</b>			

Mean Dependent Var	0.045	S.D. Dependent Var	2.787072
Sum Squared Resid	2366.848	S.E. Of Regression	2.794885
<b>R-Squared</b>	<b>0.00098</b>	Adjusted R-Squared	-0.00561
<b>F (2, 303)</b>	<b>0.148651</b>	<b>P-Value(F)</b>	<b>0.861933</b>
Log-Likelihood	-747.1918	Akaike Criterion	1500.384
Schwarz Criterion	1511.554	Hannan-Quinn	1504.851

The above table showing the results of Multiple Regression for BMV IPC 50 Daily Returns and Covid-19 Daily New Cases and Death Cases in Mexico. The Covid-19 Daily New Cases and Death Cases are independent variables and BMV IPS 50 Daily Returns is dependent variable. The results show that the regression model does not good fit the data as F-test's p- value is greater than 0.05 and the model r-squared is 0.00. When looked at the independent variables coefficients, it is found that both the independent variables insignificant at 5% level, hence, the null hypothesis of no significant Impact of COVID-19 New and Death Case on the daily returns of BMV IPC 50 is not rejected.

Table 13 - Showing the Multiple Regression for JSE SENS Daily Returns and Covid-19 Daily New Cases and Death Cases in South Africa

<b>Variable</b>	<b>Coefficient</b>	<b>t-Stat. Value</b>	<b>P-Value</b>
Constant	0.3157	0.1878	0.0938
South Africa New Cases	0.000	0.000	0.6081
South Africa Death Cases	0.000	0.000	0.6145
<b>Summary</b>			
Mean Dependent Var	0.344314	S.D. Dependent Var	2.337625
Sum Squared Resid	1665.221	S.E. Of Regression	2.344307
<b>R-Squared</b>	<b>0.000869</b>	Adjusted R-Squared	-0.00573
<b>F (2, 303)</b>	<b>0.131786</b>	<b>P-Value(F)</b>	<b>0.876579</b>
Log-Likelihood	-693.3967	Akaike Criterion	1392.793
Schwarz Criterion	1403.964	Hannan-Quinn	1397.261

The above table showing the results of Multiple Regression for JSE SENS Daily Returns and Covid-19 Daily New Cases and Death Cases in South Africa. The Covid-19 Daily New Cases and Death Cases are independent variables and JSE SENS Daily Returns is dependent variable. The results show that the regression model does not good fit the data as F-test's p-value is greater than 0.05 and the model r-squared is 0.00. When looked at the independent variables coefficients, it is found that both the independent variables insignificant at 5% level, hence, the null hypothesis of no significant Impact of COVID-19 New and Death Case on the daily returns of JSE SENS is not rejected.

Table 14 - Showing the Multiple Regression for MOSCOW MOEX Daily Returns and Covid-19 Daily New Cases and Death Cases in Russia

<b>Variable</b>	<b>Coefficient</b>	<b>t-Stat. Value</b>	<b>P-Value</b>
Constant	0.094	0.18155	0.603

Russia New Cases	0.000	0.000	0.3567
Russia Death Cases	0.000	0.000	0.3351
<b>Summary</b>			
Mean Dependent Var	0.16817	S.D. Dependent Var	1.867885
Sum Squared Resid	1060.839	S.E. of Regression	1.871128
<b>R-Squared</b>	<b>0.003105</b>	Adjusted R-Squared	-0.00348
<b>F (2, 303)</b>	<b>0.471837</b>	<b>P-Value(F)</b>	<b>0.624313</b>
Log-Likelihood	-624.4094	Akaike Criterion	1254.819
Schwarz Criterion	1265.99	Hannan-Quinn	1259.286

The above table showing the results of Multiple Regression for MOSCOW MOEX Daily Returns and Covid-19 Daily New Cases and Death Cases in Russia. The Covid-19 Daily New Cases and Death Cases are independent variables and MOSCOW MOEX Daily Returns is dependent variable. The results show that the regression model does not good fit the data as F- test's p-value is greater than 0.05 and the model r-squared is 0.00. When looked at the independent variables coefficients, it is found that both the independent variables insignificant at 5% level, hence, the null hypothesis of no significant Impact of COVID-19 New and Death Case on the daily returns of MOSCOW MOEX is not rejected.

### SUMMARY OF FINDINGS

In this research to study the daily, effect on five Selected Emerging Stock Markets such as NSE Nifty, SSE Mega Cap, BMV IPS 50, JSE SENS and MOSCOW MOEX. The following are the findings of the study.

1. The results of stationarity test show that none of the variables show the stationarity after the taking the log difference for all the variables using ADF unit root test for all the variables.
2. By this analysis Descriptive Statistics using 5 Selected Emerging Counties, Daily Stock returns for the period of the 1 Jan 2020 to 30 April 2021. It shows that mean values are positive except the NSE Nifty. The results show that all the variables are negatively skewed except BMV IPS 50 index and MOSCOW MOES. The kurtosis value is more than three for all the variables, it indicating that the data series is not normally distributed. In the daily effects, the difference among stock returns of all stock markets shows that there is no significant relationship in Stock Exchange.
3. Correlation analysis tells us the degree of relationship between a pair of two variables. The selected Indies are a dependent variable and independent variables like COVID-19 New and Death Cases for the Selected Emerging Stock Markets. The results of correlation matrix of COVID-19 New and Death Cases Selected Indies like NSE Nifty, SSE Mega Cap, BMV IPS 50, JSE SENS and MOSCOW MOEX. None of variable less than the significance value 0.05 (P-VALUE). From the above results I would be concluding that the all the variables Indies are more than the significance value.
4. In the multiple regression analysis, the results show that all the selected indies and COVID-19 New and Death Cases R-Square is not more than 0.05, hence these indies are not a good model.



## CONCLUSION

Finally, this study analysis the selected Emerging Stock Markets performance. Testing picture of COVID-19 effect in selected Indies. This study using Regression analysis for the period of 1-JAN-2020 to 31-APL-2021 that makes 1 year estimated on the five selected emerging stock markets such as NSE Nifty (India), SSE Mega Cap (China), MBV IPS 50 (Mexico), JSE SENS (South Africa) and MOSCOW MOEX (Russia). The study about daily effect on the Stock Markets.

In study, I would like to concluded that in regression analysis, the daily effects accept, so the model is not getting abnormal return and this model is good. None of the Stock Exchange reached significance level. The p-value of the NSE Stock Exchange, SSE Stock Exchange, BMV Stock Exchange, JSE Stock Exchange and the MOSCOW Stock Exchange are more than

0.05. That means the stock markets daily returns are not 100 percent significant for analyzing the performance of stock markets.

In addition, not all the five selected stock markets are getting the normal return of the selected Indies are a dependent variable and independent variables like COVID New and Death Cases. From the above results I would be concluding that the all the variables Indies are more than the significance value 0.05 (P-VALUE). That means Stock Markets daily returns are not 100 percent significant for analysing the performance of stock markets.

The descriptive and Stationary analysis of selected Stock Markets daily effects of all index are come positive output except NSE Nifty and get normal return in Indies.

Thus, finally the stock market daily effects can great opportunities for investor. However, this study to get result of the testing descriptive analysis, Stationarity analysis, correlation and multiple Regressions on selected stock markets Indies. For this study, we are using statistical analysis test like Regression, Correlation, Descriptive Statistics and Stationarity testing of daily return.

However, in Regression analysis the selected Stock Exchange get more return significant value. Therefore, the Regression effects are not the best model in the stock markets to predict the future days. In this study, I would like to concluded that in regression analysis, the daily effects accept, so the model is not getting abnormal return and this model is good. None of the Stock Exchange reached significance level.

## SCOPE FOR FURTHER RESEARCH

In the study using daily effects to testing of the stock markets, return in the daily returns of five selected emerging countries Stocks using secondary data. So, the scope for the further study given below,

- We can estimate the empirical testing of daily effects on selected Indexes.
- In this study using selected emerging countries, so in the commodity market index will using in further study.

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# Multi-class image classification using CNN

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**Abstract** — *This paper presents a Region-based Convolution Neural network for image document classification and further improved in VGG16 architecture. Image Classification means the extraction of information from document images. The objective of the paper is to classify the images and label them. The RVLCDIP dataset consists of 16 classes with 16,000 images. The 16 classes are letter, memo, E-mail, file folder, form, handwritten, invoice, advertisement, budget, news article, presentation, scientific publication, questionnaire, resume, scientific report, and specification. The model was created with CNN architecture, and its accuracy and evaluation were not good, So VGG and ImageNet architecture. The dataset was taken from Kaggle Datathon@IndoML 2022 competition predicting document class from images.*

**Index Terms** — **Document image classification; CNN; VGG16; ImageNet.**

## **I.Introduction**

Documents can be classified into various classes based on their text contents and/or their structural properties. During a manual search for a particular document from a large collection of documents, knowledge about the type or structure of the document helps reduce the time necessary for the search. However, the automatic

accomplishment of the same is a challenging task. In an early study, it was observed that a real- life document can be viewed in different ways, in both geometric and logical structure spaces. The authors observed that an effective understanding of the document structure can be realized through the use of an expert system and pattern classification methods.

Automatic classification of document images is an effective initial step of various Document Image Processing tasks such as document retrieval, information extraction and text recognition, among others. The performance of a Document Information Processing system may be enhanced through efficient initial classification of an input document into a number of pre- deseveraltegories. Automatic classification also has a significant role in indexing the documents of a Digital Library. It has been seen that any large volume of documents from different categories can be better organized provided these are first classified into several categories based on their structures.

The complexity of this task is increased due to inter-class similarity and intra-class variability issues in documents. For example, an advertisement may look like a news item or a form may be very dense with items arranged in multiple columns while another form may have only a few items with each item in a distinct horizontal row, and the rows are separated wide apart.

## II. Related work

Several studies on automatic document classification have been made. An approach to the automatic generation of a decision tree for the logical labelling of business letters was proposed. A machine learning-based approach was proposed for the automatic discovery of knowledge, a modified X-Y tree was used to describe a document page and its hierarchical

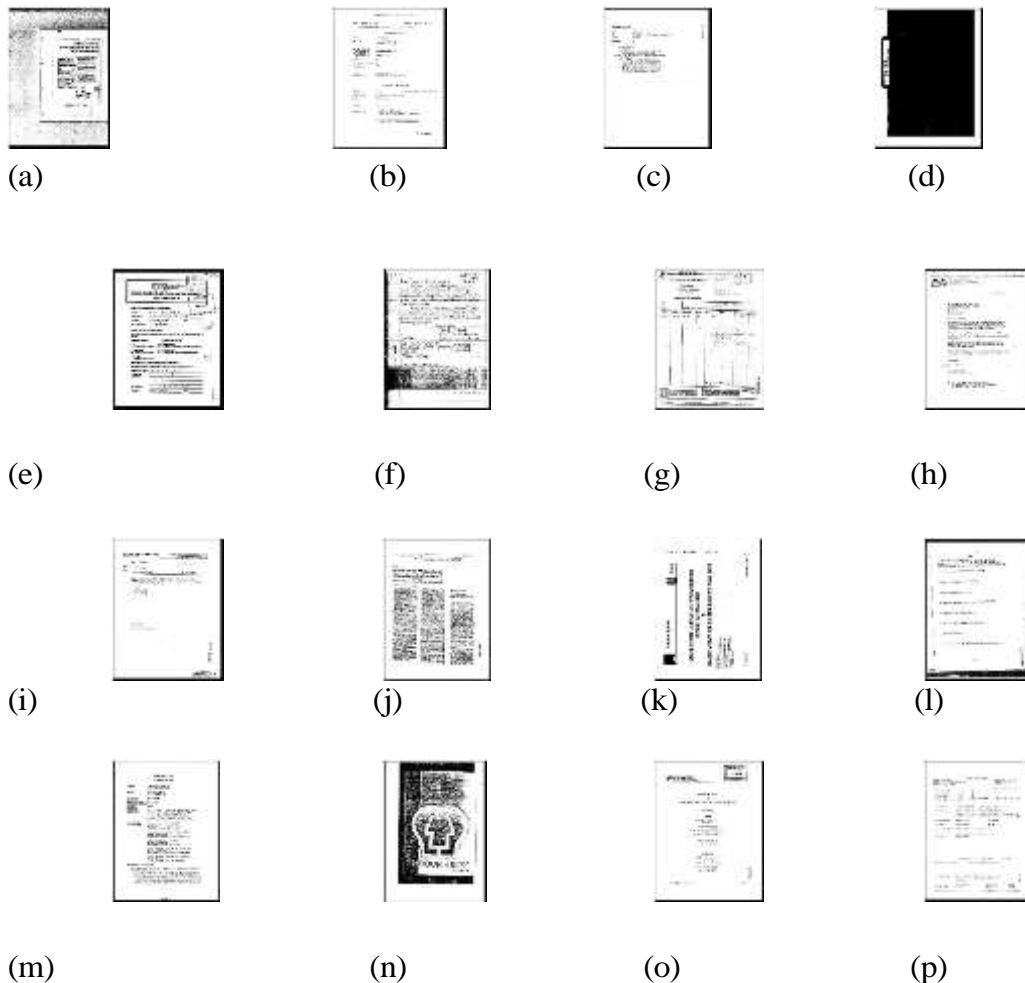


Fig. 1. samples from each of the sixteen classes of the RVL-CDIP database after resizing, preserving only document structure: (a) Advertisement, (b) Budget, (c) Email, (d) File-Folder, (e) Form, (f) Handwritten, (g) Invoice, (h) Letter, (i) Memo, (j) News Article, (k) Presentation, (l) Questionnaire, (m) Resume, (n) Scientific Publication, (o) Scientific Report, (p) Specification.

structure provided a fixed-length feature vector for a multilayer perceptron (MLP) for classification. Structural classifiers in addition to k-Nearest Neighbours (kNN).

MLP classifiers were used for the classification of form document images. In another study,

a supervised classifier was trained using given examples from each underlying class and exploited the visual similarity of document layout structure for their classification. Similarly proposed document classification is based on layout similarity.

Convolutional Neural Networks (CNN) are deeper variants of convolutional neural networks. A deep CNN architecture with rectified linear units was trained using dropout for a 10- class document image classification task, popularly known as the Tobacco3482 dataset. The concept of Transfer Learning was used to improve the recognition accuracy on the same standard dataset by using a CNN pre-trained on an ImageNet dataset. Another work in the area which used transfer learning includes which also introduced region-based modelling and introduced the larger 16-class RVL-CDIP dataset. A committee of lightweight supervised layer-wise trained models on Tobacco3482 achieved decent results without any transfer learning. Extensive exploration was done on the variation of components such as architectures, image size, aspect ratio preservation, spatial pyramidal pooling, and training set size among others using the AlexNet architecture and the RVLCDIP and ANDOC datasets. In run-length and fisher vector representations trained on an MLP were compared to AlexNet and GoogLeNet architectures on the RVL-CDIP dataset with deep models showing better performance. Also, in AlexNet, VGG16, GoogLeNet and ResNet-50 models were tested using Transfer Learning on the RVL-CDIP and Tobacco3482 datasets.

### III. Proposed method

#### A. Convolutional Neural Network Architecture

CNNs are currently one of the most popular models for deep learning. CNNs use many of the ideas used by conventional MLPs such as feed-forward connections, non-linear activations, gradient descent and backpropagation. However, their concept of shared weights and more recently activation functions like the rectified linear unit,  $f(x) = \max(0, x)$  make them resistant to the vanishing gradient problem and effective as deep learning architectures. Also, their multi- filter weight-sharing concept helps them discover robust features in input spaces like images and audio data making them powerful supervised classifiers. As seen earlier, they have found use in the task of document image classification utilizing images containing just the structural framework of a document without much, if any, content being legible. It was shown that the VGG16 model performs better on a document classification task than other CNN models. This information is utilized by us to select the VGG16 model for our base classifier model for this task. The Adam Optimizer is being used for training along with a learning rate decay tuned based on the accuracy of the validation set. The initial weights used are transferred from a model trained on the ImageNet object recognition dataset.

#### B. Region-based modelling for Document Classification

A combination of holistic and region-based modelling for document image classification was introduced. The general idea consists of training multiple machine learning models to capture influences of holistic as well as region-specific visual cues of various document classes. For example, a scientific publication or a letter contains distinctively informative header sections. In contrast, the central region of a memo can be very different from that of a resume. This supports the fact that a modelling technique governed by the combination of features from multiple document image regions can be effective in their classification.

### IV. Methodology

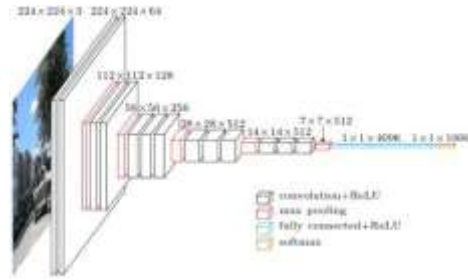


Fig. 2. Architecture of vgg16

Fig 2 - Convolutional neural network(CNN) architecture. We are using it for classifying the images. The most unique thing about VGG16 is that instead of having a large number of hyper-parameter they focused on having convolution layers of a 3x3 filter with a stride 1 and always used the same padding and maxpool layer of a 2x2 filter of stride 2. It follows this arrangement of convolution and max pool layers consistently throughout the whole architecture. In the end, it has 2 FC(fully connected layers) followed by a softmax for output. The 16 in VGG16 refers to it has 16 layers that have weights. This network is a pretty large network and it has about 138 million (approx) parameters.

**V. Result and Discussion**

**Table 1**

Operation	Formula
Convolution	$z^l = h^{l-1} * w^l$
MaxPooling	$h^l_{xy} = \max_{i=0, \dots, s, j=0, \dots, sh} (x+i)(y+j)$
Fully-connected layer	$Z^l = W^l h^{l-1}$
Relu	$ReLU(z_i) = \max(0, z_i)$

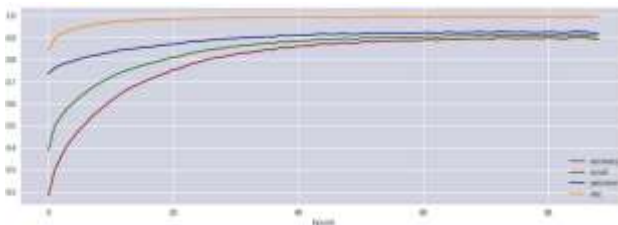


Fig. 3. Accuracy of the model

**Table 2**

Model	Accuracy
Convolutional Neural Network	73%
VGG16	88%

Comparing with convolutional Neural Network and VGG16 has given more accuracy value. because VGG16 has more layers than the convolutional Neural networks .so, we can process the input image and it gives more important data points. The neuron will perform slightly higher than Convolutional Neural networks.

**Table**

**Tracking results**

**Table 3: model’s Final results**

Model	Result
Loss	0.2911
TP	33437
FP	2929
TN	521049
FN	3990
Accuracy	0.9057
Precision	0.9195
Recall	0.8934
AUC	0.9939

**VI. CONCLUSION**

We add ImageNet and VGG16 architecture to improve the model to get better results than the existing model. We used Convolutional Neural Network (CNN) for image classification which contains Convlayers to extract features and max pooling to decrease the size of the image thus classifying the image accurately. Whereas other techniques like SVM, CNN (TimeDistributed), and K-Means Feature Extraction needed explicitly to be done. We implemented this using the RVLCDIP dataset in python.

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# Cyber Bullying Detection Using Machine Learning

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## 1. ABSTRACT:

*Cyberbullying is a significant issue on the internet that affects both adults and teenagers. Mistakes like despair and suicide have resulted from it. A increasing demand exists for the regulation of material on social media platforms. The work that follows builds a model based on the detection of cyberbullying in text data using natural language processing and machine learning utilising data from two different types of cyberbullying, hate speech tweets from Twitter and comments based on personal assaults from Wikipedia forums. To determine the most effective method, three feature extraction techniques and four classifiers are examined. So, there is a need for identification of bullying on social apps and this has become a major concern all over the world. Our motive for this research is to compare different techniques to find out the most effective technique to detect online harassment by merging NLP (natural language processing) with ML (machine learning). The model offers accuracy levels above 80% for data from Tweets and accuracy levels above 70% for data from Wikipedia.*

**KEYWORDS:** Cyberbullying; machine learning; NLP;

## 2. INTRODUCTION:

In today's world which has been made by technology, and also new age problems have been born. No doubt technology has a lot of benefits; however, it also comes with a negative side. It has given adults to cyberbullying. To put it simply, cyberbullying refers to the misuse of information technology with the intention to harass others. Subsequently, cyberbullying comes in various forms. It doesn't necessarily mean hacking someone's profiles or posing to be someone else. It also includes posting negative comments about somebody or spreading rumours to defame someone. As everyone is caught up on the social network, it makes it very easy for anyone to misuse this access. In other words, cyberbullying has become very common nowadays. It includes actions to manipulate, harass and defame any person. These hostile actions are seriously damaging and can affect anyone easily and gravely. They take place on social media, public forums, and other online information websites. A cyberbully is not necessarily a stranger; it may also be someone you know. Bullying has always been a part of society. With the inception of the internet, it was only a matter of time until bullies found their way on to this new and opportunistic medium. Using services like email and instant messenger, bullies became able to do their nasty deeds with anonymity and great distance between them and their targets. According to Cambridge dictionary the term cyberbullying is defined as the activity of using the internet to harm or frighten another person, especially by sending them unpleasant messages. The main factor that separates cyberbullying from traditional bullying is the effect that it has on the victim. Traditional bullying may end in physical damage as well as emotional and psychological damage, as opposed to cyberbullying, where it is all emotional and psychological. One of the successful approaches that learns from data and generates a model that automatically classifies proper actions is machine learning. Machine learning can be helpful to detect language patterns of the bullies and hence

can generate a model to detect cyberbullying actions. Thus, the main contribution of this paper is to proposed. The performance of machine learning models are compared on both TFIDF and sentiment analysis feature extraction methods.

The rest of the paper is organized as follows. Section II shows several related work. Section III describes the proposed approach. Section IV shows the experimental results and the evaluation of the proposed approach. Finally, Section V concludes the paper.

### 3. RELATED WORK:

There are many approaches that proposes systems which can detect cyberbullying automatically with high accuracy. First one is author Nandhini et al. [3] have proposed a model that uses Naïve Bayes machine learning approach and by their work they achieved 91% accuracy and got their dataset from MySpace.com, and then they proposed another model [4] Naïve Bayes classifier and genetic operations (FuzGen) and they achieved 87% accuracy. Another approach by Romsaiyud et al. [5] they enhanced the Naïve Bayes classifier for extract- ing the words and examining loaded pattern clustering and by this approach they achieved 95.79% accuracy on datasets from Slashdot, Kongregate, and MySpace. However, they have a problem that the cluster processes doesn't work in parallel. Moreover, in the approach proposed by Bunchanan et al. [6] they used War of Tanks game chat to get their dataset and manually classified them and then compared them to simple Naïve classification that uses sentiment analysis as a feature, their results were poor when compared to the manually classified results. Furthermore, Isa et al. [7] proposed an approach after getting their dataset from kaggle they used two classifier Naïve Bayes and SVM. The Naïve Bayes classifier yielded average accuracy of 92.81% while SVM with poly kernel yielded accuracy of 97.11%, but they did not mention their training or testing size of the dataset, so the results may not be credible. Another Approach by Dinakar et al. [8] that aimed to detect explicit bullying language pertaining to (1) Sexuality, Race & Culture and (3) intelligence, they acquired their dataset from YouTube comment section. After applying SVM and Naïve Bayes classifiers, SVM yielded accuracy of 66% and Naïve Bayes 63%. Moving on to Di Capua et al. [9], they proposed a new way for cyberbullying detection by adopting an unsupervised approach, they used the classifiers inconsistently over their dataset, applying SVM on FormSpring and achieving 67% on recall, applying GHSOM on YouTube and achieving 60% precision, 69% accuracy and 94% recall, applying Naïve Bayes on Twitter and achieving 67% accuracy. Additionally, Haidar et al. [10] proposed a model to detect cyberbullying but using Arabic language they used Naïve Bayes and achieved 90.85% precision and SVM achieved 94.1% as precision but they have high rate of false positive also the are work on Arabic language.

Zhao et al. [13] proposed framework specific for cyberbullying detection, they used word embedding that makes a list of pre-defined insulting words and assign weights to obtain bullying features, they used SVM as their main classifier and got recall of 79.4%. Then another approach was proposed by Parime et al. [14] they got their dataset from MySpace and manually marked them and they used the SVM Classifier for the classification. Moreover, Chen et al. [15] proposed a new feature extraction method called Lexical Syntactic Feature and SVM as their classifier and they achieved 77.9% precision and 77.8% recall. Furthermore, Ting et al. [16] proposed a technique based on SNM, they collected their data from social media and then used SNA measurements and sentiments as features. Seven experiments were made and they achieved around 97% precision and 71% as recall. Furthermore, Harsh Dani et al.

[17] introduced a new framework called SICD, they used KNN for classification. Finally, they achieved 0.6105 F1 score and 0.7539 AUC score.

SVM classifier was one of the approaches used in the re- search papers. Dadvar et al. [18][19][20][21] have constructed in the first and second paper a Support Vector Machine classifier using WEKA, their dataset was collected from Myspace. They achieved 43% on precision, 16% in recall and they didn't mention the accuracy, the only difference between the two papers is that they used gender information in classification in the second paper. Moreover, in their second paper 4626 comments from 3858 distinct users were collected. The comments were manually labelled as bullying (9.7%) and non-bullying (inter- annotator agreement 93%). SVM classifier was applied by them and were able to reach results of up to 78% on precision and 55% on recall. Finally, in their third paper they applied 3 models for their dataset gathered from YouTube comment section: Multi-Criteria Evaluation Systems (MCES), machine learning: (Naïve Bayes classifier, decision tree, SVM), Hybrid approach. The MCES score 72% on accuracy, while Naïve Bayes scored the highest out of the three with 66%. Moving on to another author, Potha et al. [22] have also used the SVM approach and achieved 49.8% result on accuracy. While Chavan et al. [23] used two classifiers: logistic regression and support vector machine. The logistic regression achieved 73.76 accuracy and 60% recall and 64.4% Precision. While for the support vector machine they achieved 77.65% accuracy and 58% recall and 70% precision's and they got their dataset from Kaggle.

#### 4. PROPOSED METHODOLOGY:

Pre-processing, features extraction and classification- tion step. In the pre-processing step we clean the data by removing the noise and unnecessary text. The pre-processing step is done in the following:

- Tokenization: In this part we take the text as sentences or whole paragraphs and then output the entered text as separated words in a list.
- Lowering text: This takes the list of words that got out of the tokenization and then lower all the letters Like: 'THIS IS AWESOME' is going to be 'this is awesome'.
- Stop words and encoding cleaning: This is an essential part of the pre-processing where we clean the text from those stop words and encoding characters like \n or \t which do not provide a meaningful information to the classifiers.
- Word Correction: In this part we used Microsoft Bing word correction API [24] that takes a word and then return a JSON object with the most similar words and the distance between these words and the original word. And after those two important features of the text is prepared:
- Bag-of-Word: The machine learning algorithms are not going to work directly with texts. So, we have to convert them into some other form like numbers or vectors before applying machine learning algorithm to them. In this way the data is converted by Bag-of-Words (BOW) so that it can be ready to use in next round.
- TF-IDF: One of the important features to be considered is this. TF-IDF (Term Frequency-Inverse Document Frequency) is a statistical measure to know the importance that a word carries in a document.

##### 4.1 Machine Learning

In this model we will apply five efficient algorithms used in machine learning namely- Random Forest, Decision tree, Naive Bayes, SVM and Deep Neural Networks Model (DNN) to compare them and find the most accurate algorithm among them. The algorithm having highest accuracy is discovered among the five algorithms using public datasets.

#### 4.1.1 Decision Tree

This tree classifier can be utilized in both arrangement and relapse. It can assist with addressing the choice and choose both. Decision tree has a design which resembles a tree like structure in which the parent/root hub is a condition, and descending parent hub is leaf/branch hub which is a choice of the condition. For example, If the root hub is the coin than its branch hub will be the outcome of the coin i.e., head and tail. A relapse tree yields the anticipated incentive for a tended to enter.

#### 4.1.2 Naive Bayes

This is a productive AI calculation in view of Bayes hypothesis. It predicts about the probability of occurring of an event based upon the event which already occurred previously. And when we add naïve assumption into it became the Naïve Bayes classifier.

In naïve bayes assumption we consider that each event is independent of each other and is going to make an equal contribution to final result. The best use of it is the classification of text which required a high dimensional training dataset. As stated earlier it consider that each event is independent so it cannot be used for events having relationship between them.

#### 4.1.3 Random Forest

It is a classifier which comprises of different choice tree classifiers. It is created by using subset of data and the final output of that data is based on majority ranking means the higher votes. It is slower than the decision tree which we have discussed earlier as it contains not only one but a large number of decision tree which comes together to form a forest and hence the name random forest. The greater number of decision tree are going to be present in random forest the more precise the output is going to be. Unlike decision tree it doesn't use any set of rules or formulas to show the output.

#### 4.1.4 Support Vector Machine

It can recognize the classes extraordinarily in n-layered space. Along these lines, SVM produces a more precise outcome than different calculations significantly quicker. Support vector Machine (SVM) is a regulated AI calculation which can be applied in both order and relapse the same a choice tree. By and by, SVM develops set an of hyper planes in a limitless layered space and SVM is executed with part which changes an information space into the necessary structure. For instance, Linear Kernel involves the ordinary spot result of any two examples as follows:

$$K(y, y_i) = \text{aggregate}(y \ y_i) \quad *$$

#### 4.1.5 Ensemble Method

Ensemble methods use multiple learning algorithms to obtain better predictive performance than could be obtained from any of the constituent learning algorithms alone. Here, ensemble the above machine learning algorithm using gradient boosting classifier.

From table 1 it is clear that GradientBoosting algorithm perform better

Cross-validation is a resampling procedure used to evaluate machine learning models on a limited data sample.

Cross-validation is primarily used in applied machine learning to estimate the skill of a machine learning model on unseen data. That is, to use a limited sample in order to estimate how the model is expected to perform in general when used to make predictions on data not used during the training of the model.

This method is used because it is simple to understand and because it generally results in a less biased or less optimistic estimate of the model skill than other methods, such as a simple train/test split.

From Table I it is clear that 2 fold gives greater accuracy than other n folds used in the model.

TABLE I: ENSEMBLE METHOD

	RandomForest	ExtraTrees	GradientBoost
0	0.766250	0.690000	0.742500
1	0.657500	0.633750	0.708750
2	0.782956	0.736667	0.799560
3	0.610000	0.653750	0.741250
4	0.570881	0.600881	0.785535

#### 4.1.6 Stacking Models

Stack ensemble method is to handle a machine learning problem using different types of models that are capable of learning to an extent, not the whole space of the problem. Using these models we can make intermediate predictions and then add a new model that can learn using the intermediate predictions.

After ensemble use stack method to identify the output.

TABLE II: STACKING MODELS

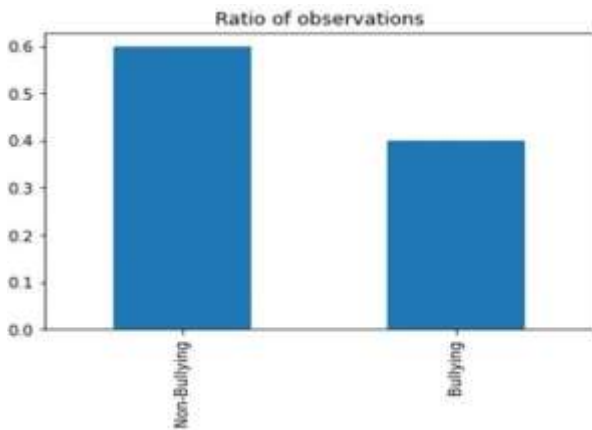
	RandomForest	ExtraTrees	GradientBoost	stackingModel
0	0.766250	0.690000	0.742500	0.757500
1	0.657500	0.633750	0.708750	0.702500
2	0.782956	0.736667	0.799560	0.800000
3	0.610000	0.653750	0.741250	0.739560
4	0.570881	0.600881	0.785535	0.712138

### 5. EXPERIMENTAL AND RESULTS:

The dataset contains two types of set which are bullying text and non-bullying text. The goal is to identify all the bullying text.

**Non-bullying Text:** The text which is not demeaning or hurtful but is a legit compliment or respectful criticism of the work of an individual. For example, comments such as “This girl is cute” are somewhat humane and demeaning.

**Bullying text:** The comments which is hurtful and abusive in nature or are promoting racism, body shaming, casteism, slut shaming etc. comes in the category of bullying text. For example, "This bitch is ugly", “you should die” are the text which is straight up bullying someone which can affect their mental health severely.



### 6. ACCURACY OF DIFFERENT ALGORITHMS:

The last step in the proposed approach is the classification step where the extracted features are fed into a classification algorithm to train, and test the classifier and hence use it in the prediction phase.

$$\text{Accuracy} = \frac{TP+TN}{TP+TN+FP+FN} \quad \text{Precision} = \frac{TP}{TP+FP} \quad \text{Recall} = \frac{TP}{TP+FN}$$

Where TP represents the number of True Positive TN represents the number of True Negatives  
 FP represents the number of False Positive FN represents the number of False Negatives

TABLE III: ACCURACY OF DIFFERENT ALGORITHMS

Model	Accuracy		Re-call		Precision	
	Train	Test	Train	Test	Train	Test
Logistic regression	93.0	81.0	0.96	0.88	0.92	0.81
SVM	92.0	76.0	0.97	0.9	0.91	0.74
Naive bayes	87.0	56.9	0.79	0.6	1.0	0.64
Decision tree	99.0	75.0	0.99	0.71	1.0	0.83
Random Forest	79.0	75.0	0.93	0.87	0.77	0.74
Gradient Boosting Classifier	72.0	75.0	0.93	0.9	0.71	0.73

**7. CONCLUSION:**

Cyberbullying is the use of technology to harass, threaten, embarrass, or target another person. Online threats and mean, aggressive, or rude texts, tweets, posts, or messages all count. So does posting personal information, pictures, or videos designed to hurt or embarrass someone else. we proposed an approach to detect cyberbullying using machine learning algorithms. And we evaluated our model on SVM ,DECISION TREE, RANDOM FOREST,GRADIENT BOOSTING, NAIVE BAYES and

LOGISTIC REGRESSION and also we used TFIDF,BAG OF WORDS. We achieved 92% accuracy on train set and 76% accuracy on test set

using SVM . Furthermore, we compared our work with another related model like decision tree, logistic regression, random forest, naïve bayes that used the same dataset. By achieving this accuracy, our work is definitely going to improve cyberbullying detection to help people to use social media safely.

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# Lung cancer detection using Deep Learning and Segmentation method

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## 1. Abstract:

*We developed and validated a deep learning (DL)-based model using the segmentation method and assessed its ability to detect lung cancer on chest radiographs. Chest radiographs for use as a training dataset and a test dataset were collected at hospital. The training dataset was used to train and validate the DL-based model with five-fold cross-validation. The model sensitivity and mean false positive indications per image (mFPI) were assessed with the independent test dataset. The training dataset included 630 radiographs with 652 nodules/masses and the test dataset included 151 radiographs with 159 nodules/masses. The DL-based model had a sensitivity of 0.73 with 0.13 mFPI in the test dataset. Sensitivity was lower in lung cancers that overlapped with blind spots such as pulmonary apices, pulmonary hila, chest wall, heart, and sub-diaphragmatic space (0.50–0.64) compared with those in non-overlapped locations (0.87). The dice coefficient for the 159 malignant lesions was on average 0.52. The DL-based model was able to detect lung cancers on chest radiographs, with low mFPI.*

**KEYWORDS:** Deep learning, Segmentation

## 2. Introduction:

Lung cancer is the primary cause of cancer death worldwide, with 2.09 million new cases and 1.8 million people dying from lung cancer in 2018. Four case-controlled studies from Japan reported in the early 2000s that the combined use of chest radiographs and sputum cytology in screening was effective for reducing lung cancer mortality. In contrast, two randomized controlled trials conducted from 1980 to 1990 concluded that screening with chest radiographs was not effective in reducing mortality in lung cancer. Although the efficacy of chest radiographs in lung cancer screening remains controversial, chest radiographs are more cost-effective, easier to access, and deliver lower radiation dose compared with low-dose computed tomography (CT). A further disadvantage of chest CT is excessive false positive (FP) results. It has been reported that 96% of nodules detected by low-dose CT screening are FPs, which commonly leads to unnecessary follow-up and invasive examinations<sup>5</sup>. Chest radiography is inferior to chest CT in terms of sensitivity but superior in terms of specificity. Taking these characteristics into consideration, the development of a computer-aided diagnosis (CAD) model for chest radiograph would have value by improving sensitivity while maintaining low FP results.

The recent application of convolutional neural networks (CNN), a field of deep learning (DL), has led to dramatic, state-of-the-art improvements in radiology. DL-based models have also shown promise for nodule/mass detection on chest radiographs, which have reported sensitivities in the range of 0.51–0.84 and mean number of FP indications per image (mFPI) of 0.02–0.34. In addition, radiologist performance for detecting nodules was better with these CAD models than without them. In clinical practice, it is often challenging for radiologists to detect nodules and to differentiate between benign and malignant nodules. Normal anatomical structures often appear as if they are nodules, which is why radiologists must pay careful attention to the shape and marginal properties of nodules. As these problems are caused by the conditions rather than the

ability of the radiologist, even skillfull radiologists can misdiagnose.

There are two main methods for detecting lesions using DL: detection and segmentation. The detection method is a region-level classification, whereas the segmentation method is a pixel-level classification. The segmentation method can provide more detailed information than the detection method. In clinical practice, classifying the size of a lesion at the pixel-level increases the likelihood of making a correct diagnosis. Pixel-level classification also makes it easier to follow up on changes in lesion size and shape, since the shape can be used as a reference during detection. It also makes it possible to consider not only the long and short diameters but also the area of the lesion when determining the effect of treatment<sup>16</sup>. However, to our knowledge, there are no studies using the segmentation method to detect pathologically proven lung cancer on chest radiographs.

The purpose of this study was to train and validate a DL-based model capable of detecting lung cancer on chest radiographs using the segmentation method, and to evaluate the characteristics of this DL-based model to improve sensitivity while maintaining low FP results.

The following points summarize the contributions of this article:

- This study developed a deep learning-based model for detection and segmentation of lung cancer on chest radiographs.
- Our dataset is high quality because all the nodules/masses were pathologically proven lung cancers, and these lesions were pixel-level annotated by two radiologists.
- The segmentation method was more informative than the classification or detection methods, which is useful not only for the detection of lung cancer but also for follow-up and treatment efficacy.

### **Model development:**

We adopted the CNN architecture using segmentation method. The segmentation method outputs more information than the detection method (which present a bounding box) or the classification method (which determine the malignancy from a single image). Maximal diameter of the tumor is particularly important in clinical practice. Since the largest diameter of the tumor often coincides with an oblique direction, not the horizontal nor the vertical direction, it is difficult to measure with detection methods which present a bounding box. Our CNN architecture was based on the encoder-decoder architecture to output segmentation. The encoder- decoder architecture has a bottleneck structure, which reduces the resolution of the feature map and improves the model robustness to noise and overfitting

In addition, one characteristic of this DL-based model is that it used both a normal chest radiograph and a black-and-white inversion of a chest radiograph. This is an augmentation that makes use of the experience of radiologists. It is known that black-and-white inversion makes it easier to confirm the presence of lung lesions overlapping blind spots. We considered that this augmentation could be effective for this model as well, so we applied a CNN architecture to each of the normal and inverted images and then an ensemble model using these two architectures.

Supplementary online shows detailed information of the model.

Using chest radiographs from the training dataset, the model was trained and validated from scratch, utilizing five-fold cross-validation. The model when the value of the loss function was

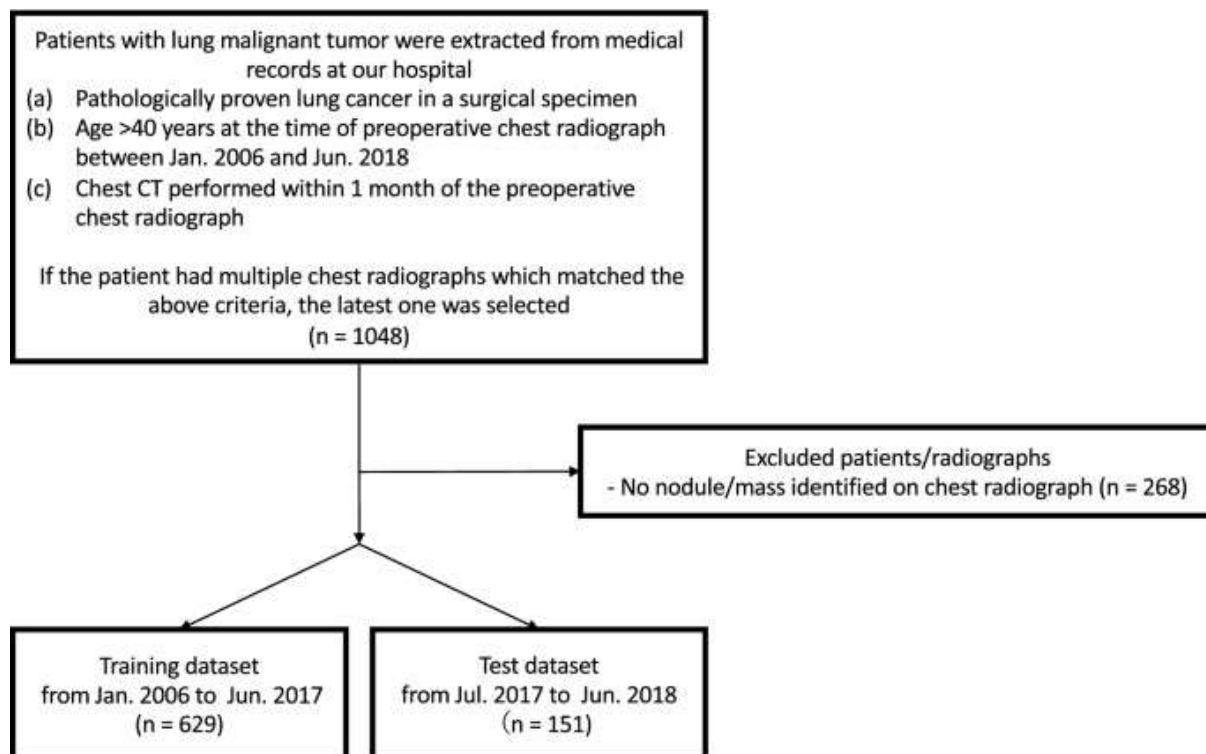
the smallest within 100 epochs using Adam (learning rate = 0.001, beta\_1 = 0.9, beta\_2 = 0.999, epsilon = 0.00000001, decay = 0.0) was adopted as the best-performing.

**Statistical analysis:**

In the detection performance test, metrics were evaluated on a per-lesion basis. We used the free-response receiver-operating characteristic (FROC) curve to evaluate whether the bounding boxes proposed by the model accurately identified malignant cancers in radiographs. The vertical axis of the FROC curve is sensitivity and the horizontal axis is mFPI. Sensitivity is the number of TPs that the model was able to identify divided by the number of ground truths. The mFPI is the number of FPs that the model mistakenly presented divided by the number of radiographs in the dataset. Thus, the FROC curve shows sensitivity as a function of the number of FPs shown on the image.

**Datasets**

For the training dataset, 629 radiographs with 652 nodules/masses were collected from 629 patients (age range 40–91 years, mean age  $70 \pm 9.0$  years, 221 women). For the test dataset, 151 radiographs with 159 nodules/masses were collected from 151 patients (age range 43–84 years, mean age  $70 \pm 9.0$  years, 57 women) (Table 1).

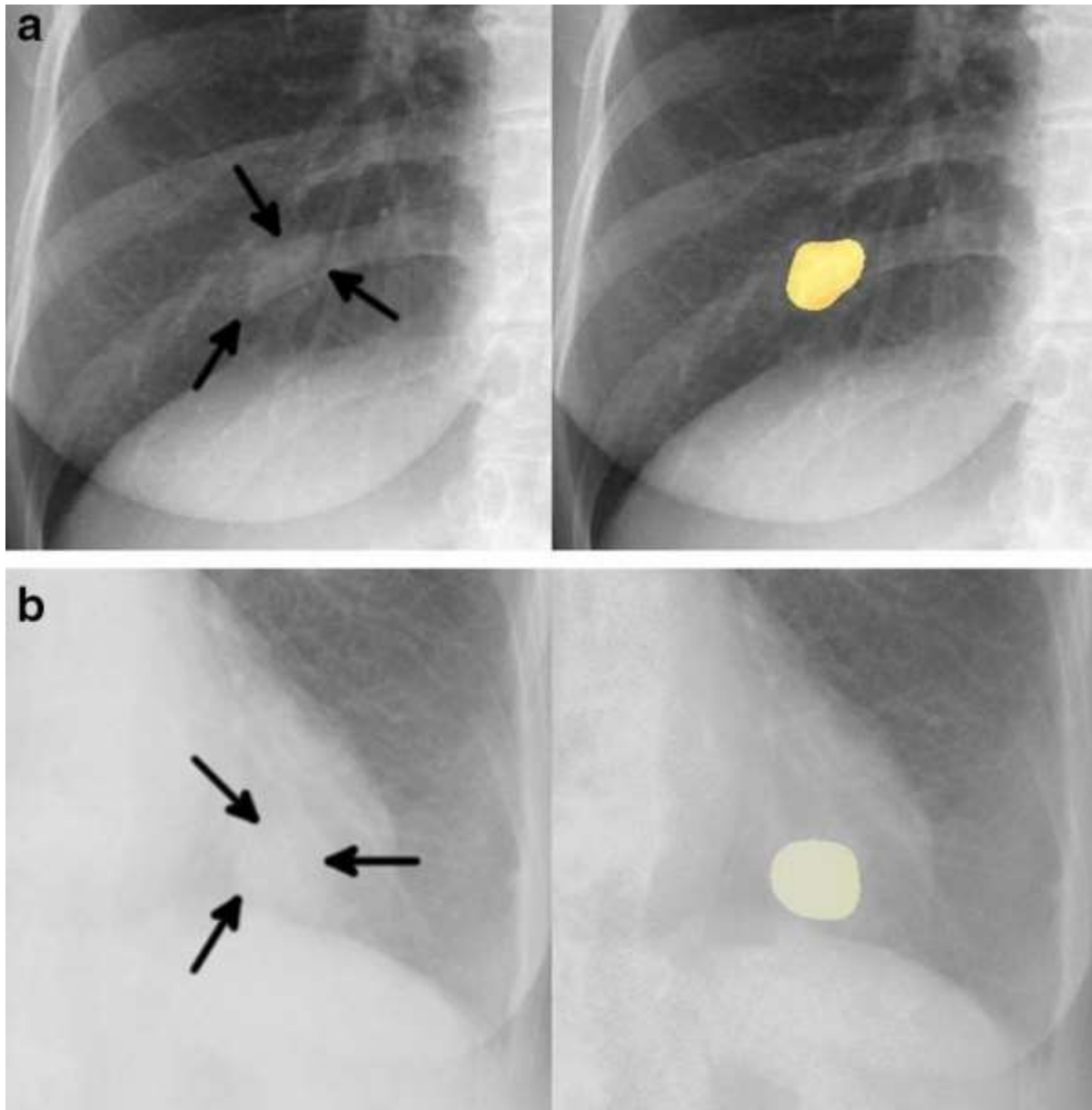


**Model test**

The DL-based model had sensitivity of 0.73 with 0.13 mFPI in the test dataset . The highest sensitivity the model attained was 1.00 for cancers with a diameter of 31–50 mm, and the second highest sensitivity was 0.85 for those with a diameter > 50 mm. For lung cancers that overlapped with blind spots such as the pulmonary apices, pulmonary hila, chest wall, heart, or sub-diaphragmatic space, sensitivity was 0.52, 0.64, 0.52, 0.56, and 0.50, respectively. The sensitivity of lesions with traceable edges on radiographs was 0.87, and that for untraceable edges was 0.21.

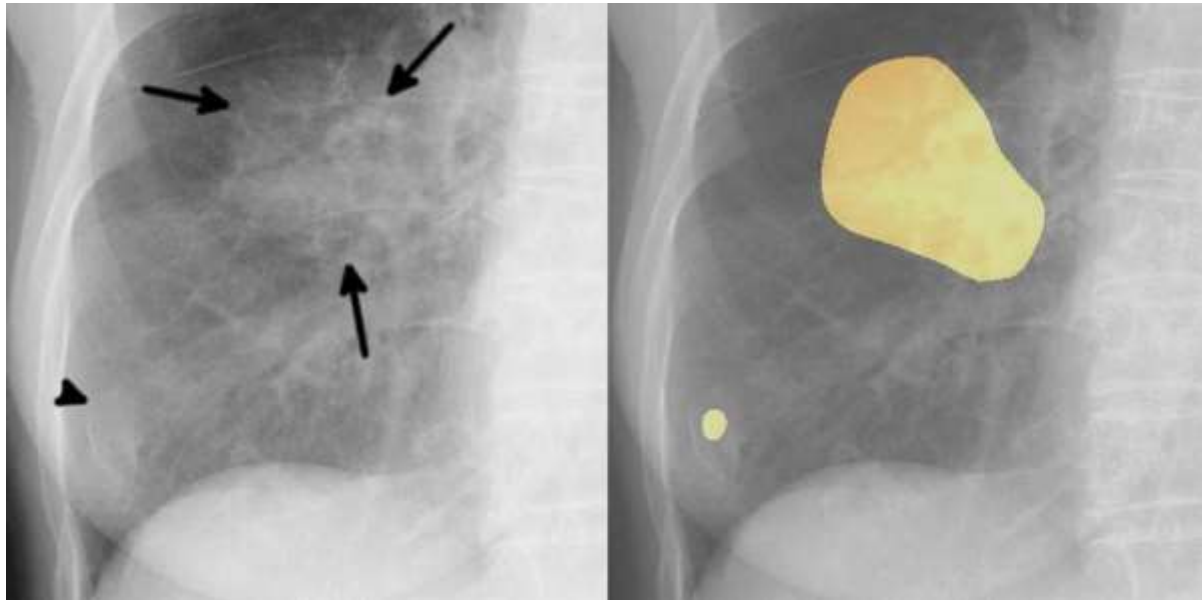
The dice coefficient for all 159 lesions was on average  $0.52 \pm 0.37$  (standard deviation, SD). For 116 lesions detected by the model, the dice coefficient was on average  $0.71 \pm 0.24$  (SD). The dice coefficient for all 71 lesions overlapping blind spots was  $0.34 \pm 0.38$  (SD). For 39 lesions detected by the model that overlapped with blind spots, the dice coefficient was  $0.62 \pm 0.29$  (SD).

Of the 20 FPs, 19 could be identified as some kind of structure on the chest radiograph by radiologists. In these 20 FPs, 13 overlapped with blind spots. There were 43 FNs, ranging in size from 9 to 72 mm (mean  $21 \pm 15$  mm), 32 of which overlapped with blind spots. There were four FNs  $> 50$  mm, all of which overlapped with blind spots. It shows representative cases of our model. It shows overlapping of a FP output with normal anatomical structures and It shows a FN lung cancer that overlapped with a blind spot. Supplementary It online shows visualized images of the first and last layers. An ablation study to use black-and-white inversion images is shown in Supplementary Data online.



Two representative true positive cases. The images on the left are original images, and those on the right are images output by our model. **(a)** A 48- year-old woman with a nodule in the right lower lobe that was diagnosed as adenocarcinoma. The nodule was confused with rib and vessels (arrows). The model detected the nodule in the right middle lung field. **(b)** A 74- year- old woman with a nodule in the left lower lobe that was diagnosed as squamous cell carcinoma. The nodule overlapped with the heart (arrows).

The lesion was identifiable by the model because its edges were traceable.



Example of one false positive case. The image on the left is an original image, and the image on the right is an image output by our model. An 81- year-old woman with a mass in the right lower lobe that was diagnosed as squamous cell carcinoma. The mass in the right middle lung field (arrows) was carcinoma. Our model detected this lesion, and also detected a slightly calcified nodule in the right lower lung field (arrowhead). This nodule was an old fracture of the right tenth rib, but was misidentified as a malignant lesion because its shape was obscured by overlap with the right eighth rib and breast.

### Conclusion:

In conclusion, a DL-based model developed using the segmentation method showed high performance in the detection of lung cancer on chest radiographs. Compared with CT, chest radiographs have advantages in terms of accessibility, cost effectiveness, and low radiation dose. However, the known effectiveness of the model for lung cancer detection is limited.

We believe that a CAD model with higher performance can support clinical detection and interpretation of malignant lesions on chest radiographs and offers additive value in lung cancer detection.

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# Detection of Covid 19 using CT Scan

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## 1. ABSTRACT

*The newly detected virus also called coronavirus spreads the disease Covid19. (WHO) confirmed this virus as a worldwide pandemic as it has infected millions of people and has taken away many lives across the globe. Covid19 disease majorly destroys the respiratory tract of human beings that ends with multiple organ failures or death in the worst case. This project detect whether patients examined are healthy, Coronavirus positive based on chest CT-Scan data. Later removing the features, the imageries were providing as the input to different machine learning classifiers that classify the chest radiographs as Covid-19 positive. The project accuracy of 97.33% in*

*the separation Based on these results, it can be concluded that the feature selection method can improve gained accuracy  $\pm 98\%$ .*

## 2. INTRODUCTION

Coronavirus illness is a disease that comes from Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). A novel coronavirus, COVID-19, is the infection caused by SARS-CoV-2 (Zhang, 2020). In December 2019, the first COVID-19 cases were reported in Wuhan city, Hubei province, China (Xu et al., 2020). World Health Organization (WHO) declared COVID-19 a pan- demic (Ducharme, 2020) on March 11 2021, up to July 13 of 2021 there are 188,404,506 reported cases around the world, which have caused 4,059,220 deaths (Worldometer, 2020). These diseases cause respiratory problems that can be treated with- out specialized medicine or equipment. Still, underlying medical issues

such as diabetes, cancer, cardiovascular and respiratory illnesses can make this sickness worse (World Health Organization, 2020). Reverse

The code (and data) in this article has been certified as Reproducible by Code Ocean: (<https://codeocean.com/>). More information on the Reproducibility

Badge Initiative is available at <https://www.elsevier.com/physical-sciences-and-engineering/computer-science/journals>.

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transcription Polymerase chain reaction (RT-PCR), gene sequencing for respiratory or blood samples are now the main methods for COVID-

19 detection (Wang et al., 2020). Other studies show that COVID-19 has similar pathologies presented in pneumonic illness, leaving chest pathologies visible in medical images. Research

shows RT-PCR correlation with Chest CT (Ai et al., 2020), while others study its correlation with X-ray chest images (Kanne et al., 2020). Typical opacities or attenuation are the most common finding in these images, with ground-glass opacity in around 57% of cases (Kong & Agarwal, 2020). Even though expert radiologists can identify the visual patterns found in these images, considering monetary resources at low-level medical institutions and the ongoing increase of cases, this diagnostic process is quite impractical. Recent research in Artificial Intelligence (AI), especially in Deep Learning approaches, shows how these techniques applied to medical images performed well. <https://doi.org/10.1016/j.mlwa.2021.100138>

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2666-8270/© 2021 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license There are only a few large open access datasets of COVID-19 X-

ray images; most of the published studies use as a foundation the COVID-19 Image Data Collection (Cohen et al., 2020), which was constructed with images from COVID-19 reports or articles, in collaboration with a radiologist to confirm pathologies in the pictures taken. Past approaches use different strategies to deal with small datasets such as transfer learning, data augmentation or combining different datasets, finding good results in papers as Civit-Masot et al. (2020) using a VGG16 with 86% accuracy; Ozturk et al. (2020) with a Dark Covid Net presents 87% accuracy classifying three classes in which is included Covid; Yoo et al. (2020) used a ResNet18 obtaining a 95% accuracy; Sethy et al. (2020) used a ResNet50 for a 95.33% accuracy, and Minaee et al. (2020) used Squeeze Net for a 95.45% accuracy;

Panwar et al. (2020) achieved 97.62% using a nCovnet; Apostolopoulos

and Mpesiana (2020) improved the results using a VGG19-MobileNet with a 97.8% accuracy, and finally higher results are found in Jain et al. (2020) using a ResNet101 with 98.95% and Khan et al. (2020) with a 99% accuracy using CoroNet a model based on an Xception.

This paper presents a new approach using existing Deep Learning models. It focuses on enhancing the preprocessing stage to obtain accurate and reliable results classifying COVID-19 from Chest X-ray images. The preprocessing step involves a network to filter the images based on the projection it is (lateral or frontal), some common operations such as normalization, standardization, and resizing to reduce data variability, which may hurt the performance of the classification models, and a segmentation model (U-Net) to extract the lung region which contains the relevant information, and discard the information of the surroundings that can produce misleading results (de Informática, 2020). Following the preprocessing stage comes the classification model (VGG16-19), using the transfer learning scheme that takes advantage of pre-trained weights from a much bigger dataset, such as ImageNet, and helps the training process of the network in performance and time to convergence. It is worth noting that the dataset used for this research is at

least ten times bigger than the ones used in previous works. Finally,

the visualization of heatmaps for different images provides helpful information about the regions of the images that contribute to the prediction of the network, which in ideal conditions should focus on the appearance of the lungs, backing the importance of lung segmentation in the preprocessing stage. After this section, the paper follows the next order: first, the Methodology applied for these approaches, followed by the experiments and results obtained, a discussion of the products, and lastly the conclusions.

## 2. Methodology

Our methodology consists of three main experiments to evaluate the

performance of the models and assess the influence of the different stages of the process. Each experiment follows the workflow shown in Fig. 1. The difference between experiments is the dataset used.

In all instances, the same images for COVID-19 positive cases were used. Meanwhile, three different datasets for negative cases were used. In that order, Experiment 1 and 2 consists of evaluating positive vs. negative cases datasets, and Experiment 3 involves Pre-COVID era images (images from 2015-2017).

## 2.1. Datasets

A total of 9 Chest X-ray images datasets were used in different stages:

### 2.1.1. COVID-19 classification datasets

The following datasets were used to train the classification mod-

els: BIMCV-COVID19+(Vayá et al., 2020), BIMCV-COVID- (Medical

Imaging Databank of the Valencia region BIMCV, 2020), and Spain Pre-COVID era dataset. These datasets were provided by the Medical Imaging Databank of the Valencia Region (BIMCV). Also, for compar- ing these processes with other previous works, we use another two databases. For positive cases, the COVID-19 Image Data Collection by Cohen et al. (2020), and negative cases compound by Normal, Viral Pneumonia and Bacterial Pneumonia database by Daniel Kermany et al. (2018), these last databases can be found (COVID-19 X rays, 2020).

## 3. RELATED WORK

Our methodology consists of three main experiments to evaluate the performance of the models and assess the influence of the different

stages of the process. Each experiment follows the workflow shown in Fig. 1. The difference between experiments is the dataset used.

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### 2.1.2. Image projection filtering

The images from the COVID-19 datasets have a label corresponding to the image projection: frontal (posteroanterior and anteroposterior) and lateral. Upon manual inspection, several

mismatched labels were found, affecting model performance, given the difference between the information available from the two views and that not every patient had both views available. In order to automate the process of filtering the images according to the projection, a classification model was trained on a subset of BIMCV-Padchest dataset (Bustos et al., 2020), with 2481 frontal images and 815 lateral images. This model allowed us to filter the COVID-19 datasets efficiently and keep the frontal projection images that offer more information than lateral images.

Finally, to train COVID-19 classification models, the positive dataset (BIMCV-COVID19+), once separated, has 12,802 frontal images. In Experiment 1, images from BIMCV-COVID-dataset were used as negative cases, with 4610 frontal images. BIMCV-COVID — was not organized; also, some of the patients from this dataset were confirmed as COVID-19 positive in a posterior evaluation. Therefore, the models trained on this data could have a biased or unfavorable performance based on dataset size and false positives identified by radiologists.

Experiment 2 used a curated version of BIMCV-COVID — for negative patients to avoid this bias, by eliminating patients' images that correlate with the positive dataset, a total of 1370 images were excluded. Finally, Experiment 3 used a Pre-COVID dataset of images collected from European patients between 2015 and 2017. There are 5469 images; this dataset was obtained from BIMCV, but it has not been published yet.

### 2.1.3. Lung segmentation

Three datasets were used to train the U-Net models for these segmentations: Montgomery dataset (Jaeger et al., 2020) with 138 images, JSTR (Shiraishi et al., 2020) with 240, and NIH (Tang et al., 2020) with 100. Despite the apparent small amount of data, the quantity and variability of the images was enough to achieve a useful segmentation model.

### 2.2. Image separation

For the classification task, data were divided into a train (60%), validation (20%), and test (20%) partitions, following the clinical information to avoid images from the same subject in two different partitions, which could generate bias and overfitting in the models. Accordingly, the data distribution was as follows:

- For the classification model to filter images based on the projection, the data was composed of frontal images, 1,150, 723, and 608 for train, test, and validation partitions. In contrast, in the same partitions, the separation of lateral images was 375, 236, and 204 images.

- For the COVID-19 classification model, the positive cases dataset has 6475 images for train, 3454 for test, and 2873 for the validation set. Meanwhile, for the negative cases datasets, the BIMCV-COVID dataset is divided into 2342, 1228, and 1040 images for train, test, and validation. After the BIMCV-COVID-dataset was curated, there were 1645 images, 895, and 700 for the train,

test, and validation sets. Finally, the Pre-COVID era dataset was divided into 2803 images, 1401, and 1265 for the train, test, and validation sets.

- For the COVID-19 comparison with previous works, the COVID cases dataset has 286 images for train, 96 for the test, and 96

for the validation set. Meanwhile, for the negative cases datasets, Normal images are divided into 809 for training, 270 for test and validation sets. For Pneumonia, there are 2329 images for the train, 777 for the other two groups each.

#### 4. PROPOSED METHODOLOGY

The competencies of different varieties of the pre-trained CNNs were determined for the immediate analysis of Covid19 using chest radiographs. SVM Support Vector Machine was obtained to detect the determined results of effective the more high accuracy level of final outputs of applying a large set of images dataset along with the dataset. SVM models were evaluated to be adequate and separated by the Covid-19 positive patient chest radiographs from healthy chest CT scans. Also, it will be defined the people suffering from pneumonia and from Covid-19.

#### ADVANTAGES

Gives More accuracy Time complexity is less

Prediction through nodules gives more consistency. Cost is lesser than other

#### 5. Discussion

For the classification tasks proposed in this research, the better results achieved were using the model VGG19. The first classification task was needed to filter data, as it was a real problem within the datasets, and as their size increases over time, the manual preprocessing becomes unmanageable. More than that is a powerful tool to prevent feeding images from lateral Chest X-ray to the model's training process. It is appropriate to say that this classification does not avoid glitches from images different from frontal or lateral Chest X-ray ones.

For the previous study, by following experiment order is seen that

for Experiment 1, first test accuracy, Table 4 shows better performance than Table 3, meaning segmentation works, but also Table 5 has better accuracy. In this case, lungs are out of images, meaning models use other image characteristics rather than lungs pathologies for classifying. As shown in Table 6, the COVID-19 positive label has higher accuracy for all parts. In general, these models use to mismatch more the negative cases than positive ones; ROC and Precision–Recall curves enhance Tables 3–5 by showing that using a different threshold, the model predicts better with a continuous leading of part e. Heatmaps found attractively marked zones. Part c images see the model use any feature except the lungs for classifying, making these types not useful for other applications rather than this classification task. Meanwhile, part e commonly uses information in the lungs near surrounding or

as COVID images in Fig. 8, also features in the removed lungs areas. Finally, in part d, Fig. 7 identifies similar zones in the lungs for classification. These experiments have correlation cases in the negative dataset related to the positive ones, so the model has difficulties recognizing those cases. Also, these can make mismatch predictions for outside dataset images. To solve those problems, correlation cases were taken out of the negative dataset and left Experiment 2.

Experiment 2 shows better classification results in almost all experiments than Experiment 1, except on part e. Accuracy in the COVID-19 positive label presents the same behavior as the previous experiment.

In which the model used to mismatch more No-COVID patients, the Results in ROC and Precision–Recall curves are also enhanced compared to the last experiment. In these cases, the heatmaps show that the COVID images model initially focuses on lung information features. As the top-left image in Fig. 11 presents, these features are not used in all Table 16

Performance metrics of proposed method with other previous works using the comparison database.

Model Accuracy F1 score Recall Precisión Proposed Method 99.06 99.06 99.06 99.07

CoroNet (Khan et al., 2020) 99 98.5 99.3 98.3

VGG19 (Apostolopoulos & Mpesiana, 2020) 98.75 93.06 92.85 93.27 cases. Part e results are similar to the last experiment in which immediate surroundings and missing lung zones. In contrast to Experiment 1 results, part d heatmaps focus on the considerable lungs portion for prediction. As No-COVID images show, the model focuses on out of lung area images because there is no relevant information inside, meaning in these cases, the model sets on lungs pathologies.

Finally, Experiment 3 shows the Pre-COVID era incident in this model; the first three tables show different results from experiments 1 and 2 but with the same tendency. Hence, segmentation enhances classification but taking the lungs out presents even better results.

Even accuracy for the COVID label is better in these cases in lung segmentation images. On the other hand, ROC and Precision–Recall curves have better outcomes for part c and e experiments rather than part e, meaning that with a different threshold, it can perform better. Leaving the heatmaps as valuable information, the first experiment model uses inside the lungs information and outside info to represent bias noise testing in other images. Fig. 18 uses mainly information at the top-right of the pictures to classify COVID cases simultaneously for No-COVID use info near the lungs area. Finally, Fig. 17 shows information inside the lungs is taking into account for type COVID and outside of it for the contrary case.

In general, experiments demonstrate how segmentation helps the model focus on relevant information. As lung characteristics and distribution around datasets are different, the segmentation task provides information related to shape and size to the parts d and e. Hence, the mere fact of performing a segmentation of the lungs highlights relevant details of the images for better classification. Regarding part e, where models show unexpectedly high results, indicates how the information of the images surrounding the lungs alters the result by predicting the correct label for an image without even having the data used to perform a medical diagnosis. It is worth mentioning that the lung segmentation is not always perfect, leaving small lung regions in some cases. The segmentation model used for all experiments, U-Net 3, corresponds to the architecture presented in the original paper.

Finally, Table 16 shows the comparison of our development with other previous works.

As shown, the results are better using similar conditions. Meanwhile, it is a remarkable declaration that because the Cohen dataset was growing on the development of previous works, we have more images. The same happens with the Normal and Pneumonia dataset, plus choosing the images randomly. We can say it is not an ideal comparison.

## 6. Conclusions

This approach shows how existing models can be helpful for multiple tasks, especially if it is considered that the changed U-Net models

do not have better performance. Also is shown how image noise can generate bias in the models. Most metrics show the images without segmentation as better for classifying COVID disease. Further analysis shows that even if metrics are better, these models are based on visible pathologies across lungs as clear evidence of COVID, so real accurate models must center on lungs parts for classifying. In this case, segmentation is needed for reliable results by reducing this bias. Transfer learning was vital for the results presented. As shown, classification models using this technique need between 20 and 30 epochs to converge, while segmentation models without transfer learning need about

200. Was presented a series of models to determine COVID-19 Disease in Chest X-ray images

with a general accuracy of 92.72%, classifying COVID and NO-COVID images. Meanwhile, Only for the COVID label, the approach has a 95.63% accuracy in the test dataset for a threshold

of 0.5. Changing the threshold shows an increase in the accuracy of models up to 98%.

The segmentation task shows a high probability of providing extra information to part d and e in all experiments, culminating in improved results by segmenting lungs and adding information combined with lungs surrounding noise. This noise is associated with cables, captured devices, patient's age or gender, making images without lungs have more details for classifying in these cases. Either future application using models without lungs could have the highest chances of mislabeling images because of noise bias. Further investigation is required to segment pathologies identified by the expert radiologist to ensure any noise is a factor for bias. It is also essential to highlight that results presented do not necessarily mean the same performance in all datasets. For example, primary datasets come from European patients; other world patients may show minor data capture changes or pathologies, assuming a better classification is needed using worldwide datasets. In addition, separating the datasets by gender will provide more informa-

tion on the model's scope, as the soft tissues of the breast may hide parts of the lungs, and it is unknown whether this is considered a bias in the prediction of the model.

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# Instagram Real and Fake Account Detection

Nivetha M

## **Abstract**

*One of the major issues with Online Social Networks (OSNs) is fake interaction, which is used to artificially boost an account's popularity. Because phoney involvement causes businesses to lose money, inaccurate audience targeting in advertising, inaccurate product prediction systems, and an undesirable social network atmosphere, its detection is essential. This study focuses on the identification of automated and bogus Instagram profiles that generate phoney engagement. We are aware of no publicly accessible dataset regarding automated and phoney accounts. Two datasets have been created for this purpose in order to detect automated and phoney accounts.*

*Two datasets have been created for this purpose in order to detect automated and phoney accounts. Machine learning approaches including Naive Bayes, logistic regression, support vector machines, Decision Tree Classifier, SVM, Random Forest, KNN and SGD are used to find these accounts. In addition, a cost-sensitive evolutionary algorithm is used to detect automated accounts due to the dataset's artificial bias. Smote technique is used to address the fake dataset's unevenness issue.*

## **Keywords**

Smote, Logistic Regression, SVM, Decision Tree, Random Forest, KNN, Naïve Bayes, SGD, XGB, Gradient Boosting Classifier

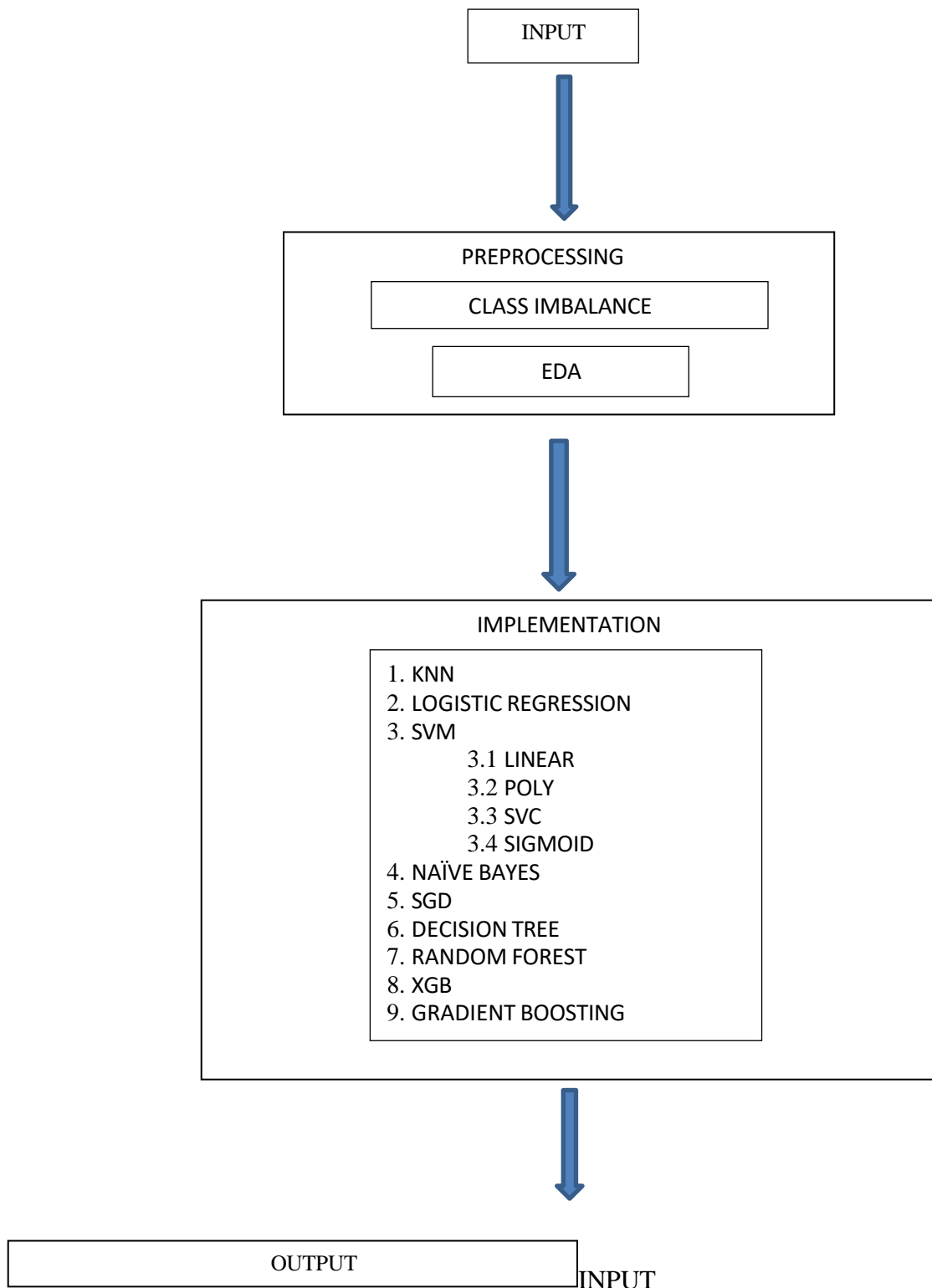
## **1. Introduction**

Being active on social media is becoming a need for everyday living in the modern world. These social media sites are commonly utilised to advertise businesses in addition to serving as a place to share thoughts and moments. As a result, industries like targeted customer capture and digital marketing experienced significant advancements. Given its open nature, it is also being abused by cunning individuals who increase their false popularity metrics in order to carry out fake promotions. With close to 1 billion active users, Instagram is one of the popular new social media networks. One out of every 10 Instagram accounts is false, according to a poll. This paper will outline the machine learning strategy we used to identify and categorise phoney Instagram accounts.

**Real Account:** Active accounts with profile photographs, well-written bios, a readable username, and media posts are considered real accounts.

**Fake Account:** Fake accounts are those that typically have odd names and a small number of followers. These accounts have hardly any posts at all. The primary goal of creating such accounts is to boost some users' popularity metrics by gaining more followers. With the aid of automated systems, these accounts are established in quantity.

## **2. METHODOLOGY**



Dataset is downloaded from Kaggle.

The data which we collected is used to derive the values for the parameters such as artificial activity and spam behavior. We considered the following terms for deciding if an account is fake or not:

1. Is profile picture present or not:

A profile picture is the image which is displayed for an account in all its interactions across the platform. This thing plays a vital role in detection of fake account.

2. Nums/Length of username:

A username is a unique name assigned to each user. It can include characters as well as numbers. A valid username can be something which is close to user's actual name, and which includes minimum numerical values

3. How many full name words are present:

Name of account holder can include just first name or first name and surname, or it might include name of a brand/something else. Taking into consideration how many full name words are present helps in identifying if an account is fake or not.

4. Nums/length of full name:

This includes the length of account holder's name. If account name is absent, the chances of account being fake increases.

5. If account name and username are equal:

Having account name and username same or similar gives more chances of account being real. If it doesn't matches, it is more probable that the account is fake.

6. Length of account description:

An account description or bio is a small summary found underneath the username. Number of words and characters present in an account's description can be considered while detecting fake/real account. Fake accounts generally have no bio/less bio.

7. Is any external URL present in bio:

Fake accounts generally make use of external URL in their bio/description for promotional activities.

8. If the account is private or not:

An Instagram account can be private or public. Posts shared by public account are visible to anyone on the platform, whereas the posts shared by private account are only visible to their respective followers.

9. Total number of posts of that account:

An Instagram post is something which a user shares on the platform.

10. Total number of followers of an Instagram account:

An Instagram Follower is a user who clicks on the follow button and follows your account. These users are able to give engagement on any of your posts.

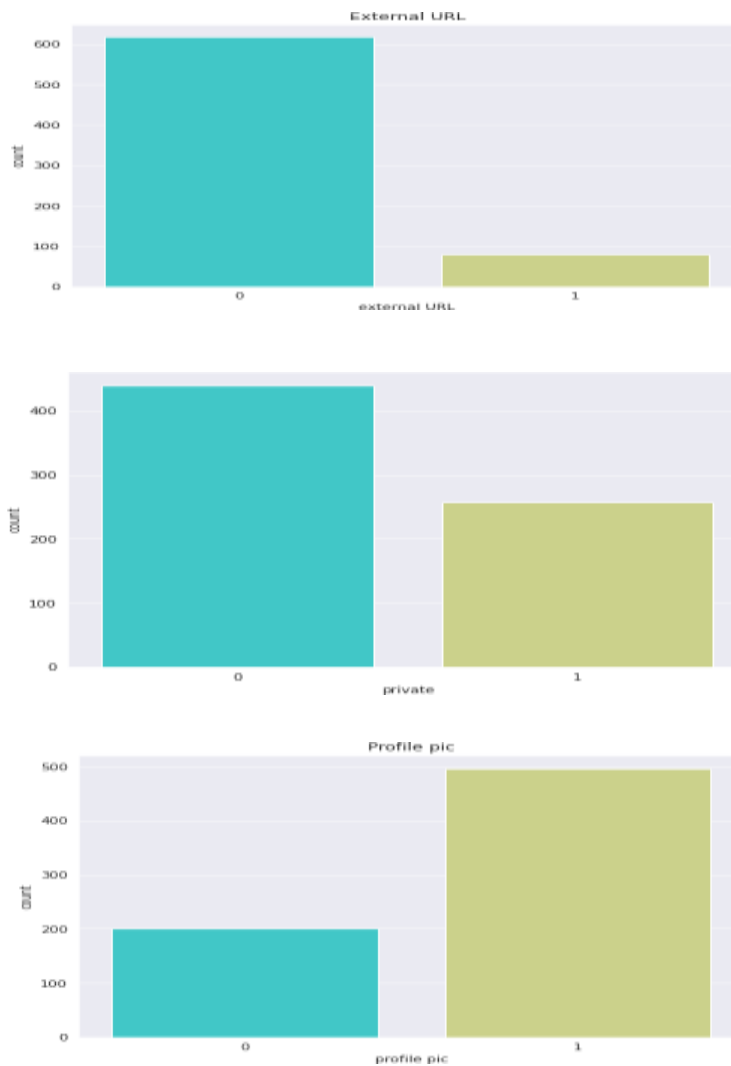
11. Total number of following by an Instagram account:

Following refers to all the users you follow on the platform. The data collected is used to get the values for the above-mentioned parameters. Using these parameters different decision trees are formed. And hence after applying gradient boosting algorithm, we are able to determine if the account is fake or real.

## 2.1 PREPROCESSING

The dataset from the fraudulent accounts has an uneven distribution of classes. The overrepresented class does poorly as a result. The number of samples for bogus accounts is increased by using the SMOTE oversampling technique [16]. For this project, K is chosen as 5. SMOTE-NC, which takes into account factors other than just quantity classes, is used in the

implementation of SMOTE.EDA for inputs to know about data.



## 2.2 IMPLEMENTATION

This Problem is solved by various methods. They are

### 2.2.1 KNN

A k-nearest-neighbor algorithm, often abbreviated k-nn, is an approach to data classification that estimates how likely a data point is to be a member of one group or the other depending on what group the data points nearest to it are in. The k-nearest-neighbor is an example of a "lazy learner" algorithm, meaning that it does not build a model using the training set until a query of the data set is performed.

### 2.2.2 Logistic Regression:

Logistic regression is used to describe data and to explain the relationship between one dependent binary variable and one or more nominal, ordinal, interval or ratio-level independent

variables.

### 2.2.3 Support Vector Machine

Support Vector Machine or SVM is one of the most popular Supervised Learning algorithms, which is used for Classification as well as Regression problems. However, primarily, it is used for Classification problems in Machine Learning. The goal of the SVM algorithm is to create the best line or decision boundary that can segregate n-dimensional space into classes so that we can easily put the new data point in the correct category in the future. This best decision boundary is called a hyperplane. SVM chooses the extreme points/vectors that help in creating the hyperplane. These extreme cases are called as support vectors, and hence algorithm is termed as Support Vector Machine

### 2.2.4 Naïve Bayes

Naïve Bayes Classifier is one of the simple and most effective Classification algorithms which **helps in building the fast machine learning models that can make quick predictions**. It is a probabilistic classifier, which means it predicts on the basis of the probability of an object.

### 2.2.5 SGD Classifier

Stochastic Gradient Descent (SGD) is a simple yet efficient optimization algorithm used to find the values of parameters/coefficients of functions that minimize a cost function. In other words, it is used for discriminative learning of linear classifiers under convex loss functions such as SVM and Logistic regression. It has been successfully applied to large-scale datasets because the update to the coefficients is performed for each training instance, rather than at the end of instances. Stochastic Gradient Descent (SGD) classifier basically implements a plain SGD learning routine supporting various loss functions and penalties for classification. Scikit-learn provides **SGDClassifier** module to implement SGD classification.

### 2.2.6 Decision Trees :

Decision Trees involves a procedure where the datasets continuously split according to a certain parameter. Here, we are considering value which contains more fake accounts. The goal is to create a model which will predict this value. A Decision tree is basically a tree structure, which has leaves, branches and internal nodes. An internal node denotes test on an attribute. A branch represents an outcome of the test. And a leaf node commonly known as terminal node holds a class label.

### 2.2.7 Random Forest Classifier

Random forest is a commonly-used machine learning algorithm trademarked by Leo Breiman and Adele Cutler, which combines the output of multiple decision trees to reach a single result. Its ease of use and flexibility have fueled its adoption, as it handles both classification and regression problems.

### 2.2.8 XGBOOST

XGBoost, which stands for Extreme Gradient Boosting, is a scalable, distributed gradient Boosted decision tree (GBDT) machine learning library. It provides parallel tree boosting and is the leading machine learning library for regression, classification, and ranking problems.

It's vital to an understanding of XGBoost to first grasp the machine learning concepts and algorithms that XGBoost builds upon: supervised machine learning, decision trees, ensemble learning, and Gradient Boosting.

### 2.2.9 Gradient Boosting Algorithm

Gradient Boosting Algorithm can be used for predicting not only continuous target variable (as a Regressor) but also categorical target variable (as a Classifier). When it is used as a regressor, the cost function is Mean Squared Error (MSE) and when it is used as a classifier then the cost function is Log Loss.

## 2.3 RESULT

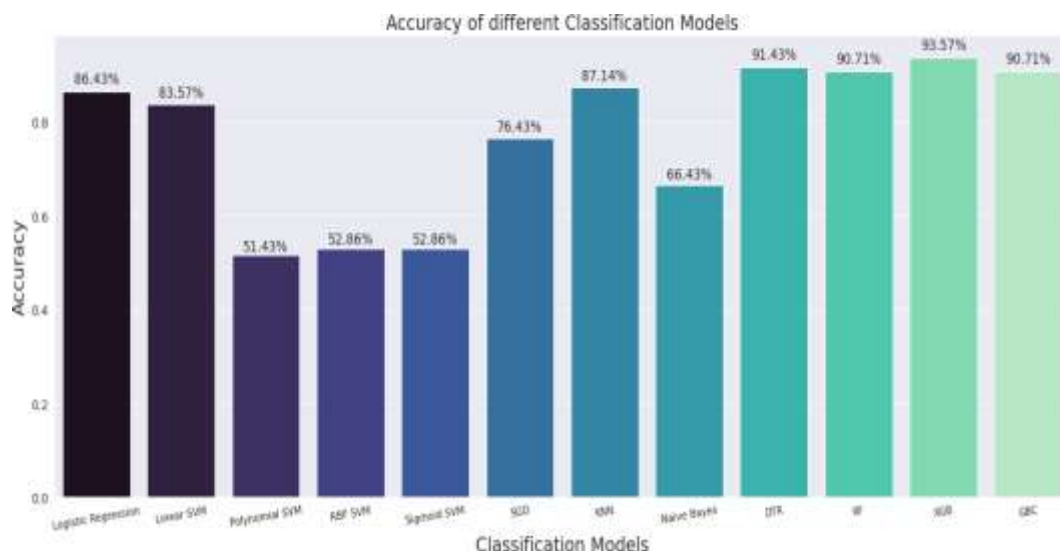
From the below table, we can observe that the error occurred using gradient boost classifier is least. Also, in case of missing inputs, gradient boost classifier turns out to be the best performer, giving accurate results. A comparative analysis of result obtained by using various algorithms is shown in the table below. The terms considered while comparative analysis have been explained below.

### RMSE

Lower values of RMSE denotes better fit. Root Mean Square Error is a good measure which explains how accurately the model predicts the response. RMSE is the most important factor for fit if the main purpose of the model we're building is to predict something.

### MSE

There is no correct value for Mean Squared Error. The lower the value of MSE, the better is the model and a model with MSE value 0 means the model is perfect. Since there is no correct answer, the most preferable choice will be to select one prediction model over another.



	ALGORITHM NAME	MSE	RMSE
1	Logistic Regression	0.1357	0.3683
2	Linear SVC	0.1642	0.4053

3	Polynomial SVC	0.4857	0.6969
4	Rbf SVC	0.4714	0.6866
5	Sigmoid SVC	0.4714	0.6866
6	SGD	0.2357	0.4855
7	Decision Tree	0.1285	0.3585
8	Random Forest	0.3357	0.5794
9	KNN	0.0857	0.2927
10	Naïve Bayes	0.1	0.3162
11	Gradient Boosting Classifier	0.0642	0.2535
12	XGB	0.0928	0.3047

### 3. CONCLUSION :

In this study, we developed a novel and simple method for identifying phoney Instagram accounts. We used a number of machine learning techniques, but the XGB Algorithm stood out as the most effective. Therefore, employing this entirely eliminates the need for human work to forecast a false account. This considerably cut down on manual labour and time. Systems currently in use to forecast bogus accounts do not produce accurate findings. These systems use a limited number of out-of-date parameters. To determine if an account is authentic or phoney, we employed weighted parameters during the course of our investigation.

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# Influence of Perceived Benefit, Perceived Ease of Use and Perceived Usefulness on Online Stock Trading Behaviour

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## **Abstract**

*The mobile technology has transformed the investment sector and it allows the investors and traders to trade actively and manage the various portfolio from anywhere in the world. Mobile technology has enhanced the investor to explore the stock market and get benefits like faster, transparency and flexible in online stock trading (Chong et al., 2021). This study examined the influence of perceived benefit, perceived ease of use and perceived usefulness on online stock trading behaviour of investors. The study confirmed that perceived benefit, perceived ease of use and perceived usefulness positively predicts the online stock trading behaviour.*

**Key words:** Perceived benefit, perceived ease of use, perceived usefulness, online stock trading

## **1. Introduction:**

In present scenario the Information Technology (IT) plays a significant role. The innovation, upgradation and advanced technology have impacted the individual decision-making process. The Information technology provides the strategic benefits to the strategic users. Potential information technology enhances competitive advantage and sustainability of the company (Malar et al., 2019). Understanding the technological factor is one of the important determinants that affects the decision making (Taylor & ; Todd, 1995). In e-commerce business web-based technology provides prime benefits like cost reduction (Ahmed et al., 2003), provides various business opportunities, provides personalized service provision to customer reduce lead time (Khare, 2010).

Web technology and Convention banking is a fusion of online banking system provides improved quality service and superior service delivery with the banking sector (Dawes & ; Rowley, 1998). As per Mckinsey Banking Annual Review report states that the big data and analytics is used to team up with fintech and digital firm to manage and assess the risk. Due to digitize process the back-office cost is reduced (McKinsey's Global Banking Annual Review | McKinsey, n.d.).

The information technology plays a significant role in online banking services especially the relationship between online banking service system and mobile device were applying and sending security code that enhances services provided in India. Online banking service system



helps in value co-creation like flexibility, comfortability, effective informational technology and centralized customer service. Multi-dimensional focus is required for an information technology effective strategy to enhance the value co-creation (Malar et al., 2019).

In present scenario an individual will prefer to have multiple sources of income to get benefit of achieving financial independence, greater stability and safety, scaling faster, working from the comfort of your home and living your dream life (Five Benefits of Having Multiple Sources of Income as an Entrepreneur, n.d.). An individual can get accessed to all the information by a single click. Hence, among the options of decision making an individual major decision will rely on his or her investment and portfolio.

According the Deloitte report study states that the smart phone users in India in 2021 has 750 million out of 1.2 billion subscribers and smartphone market users is expected to reach 1 billion by 2026 (India to Have 1 billion Smartphone Users by 2026: Deloitte Report | Business Standard News, n.d.). Higher internet adoption is expected to increase smart phone demand. As per Telecom Statistics India 2021, telephone subscribers in India were 996.13(in Million) in the year 2015 and was increased to 1200.88(in Million) in the year 2021. Among this smartphone user in India, the internet subscriber was 302.36(in million) in the year 2015 was increased to 825.30(in million) in the year 2021 (Statistical Bulletin-2021 Print Final 7-4-2022(TRAJ), n.d.)

The mobile technology has transformed the investment sector and it allows the investors and traders to trade actively and manage the various portfolio from anywhere in the world. Mobile technology has enhanced the investor to explore the stock market and get benefits like faster, transparency and flexible in online stock trading (Chong et al., 2021). In August 2022 Mode of trading report stated that Internet based trading in only 9.87% (NSE, n.d.). Self-investing trading service is increased compared to the traditional investment due to low commission charged by the online trading brokers (Teo et al., 2004). Enable investors prefers for secure e-trading services compared to traditional (Roca et al., 2009). Online trading gives various benefits to its investor like lesser transaction cost, transparency in trading, and flexibility in trading (Lee, 2009).

## **2. Literature Review**

### **Perceived Benefits:**

The change in technology have enabled an individual to do more of online transaction. The technology used in smart phone have enabled the investor to explore more in stock market. There is increased online trading due to developments in internet-based transaction (Lee, 2009). Perceived benefits refer to a specific action caused due to a specific significant event occurred. Compared to traditional trading an investor prefers for online trading to get perceived benefits like transparency, less expensive, convenience and faster (Singh Director et al., 2020). Recognition, social influence, and mutuality will also influence the perceived benefits (Koivisto & ; Hamari, 2014). Khan et al., (2021) confirms that there is noteworthy moderate relationship between perceived uncertainty technology and regulatory and adopt of Internet stock trading. Thus, the following hypothesis is constructed as:

H1: Perceived benefits has positive impact on online stock trading behaviour.

### **Perceived Ease of Use:**

Li & Li (2016) states that, if information technology is costly and takes too much time to learn and adopt it then individual will never prefer to invest in such technology. The major dimension of a technology includes perceived usefulness, perceived ease of use and compatibility (Damghanian et al., 2016). It refers as an utilizing the information system that can reduces the

effort of an individual (Davis 1989, p.320). Perceived ease of use reflects simplicity and clarity (Li & ; Li, 2016) and adopting the mobile banking positively affects the individual attitude and perceived ease of use (L. L. Chong et al., 2021). Lee (2009) states that perceived ease of use has significant impact perceived usefulness and attitude. Hence, the following hypothesis is constructed as:

H2: Perceived ease of use has positive impact on online stock trading.

**Perceived Usefulness:**

It refers to a perception of an individuals towards the benefit by using the information technology (Lau et al., n.d.-b). In opting of technology one of the most studied variables is perceived usefulness and it is also found that consumer decision to opt for technology depends on perceived usefulness and it is one of the important predictors (Jeyaraj et al., 2006). Earlier research has shown that in determining the consumer decision on m-commerce or mobile internet activity depends on the perceived usefulness and it is one of the important factors that affects the decision making. (Jeyaraj et al., 2006; Lu et al., 2005; Wei et al., 2009). It is worthwhile to investigate the influence of perceived usefulness on online trading. Hence, the following hypothesis is constructed as:

H3: Perceived usefulness has positive impact on online stock trading.

**3. Research Methodology**

This study is conducted to examine the influence of perceived benefit, perceived ease of use and perceived usefulness on online stock trading behaviour. The population of the study comprise of online stock traders. Self-reporting questionnaire was used to collect the data on the basis of convenience s ling method. Questionnaire was administered through the available like known investors and stock brokers contacts using Google form and study received 132 responses.

Self-reporting questionnaire administered to collect the primary data includes questionnaire to measure perceived benefit, perceived ease of use and perceived usefulness of online traders and online stock trading behaviour. The data is collected from stock traders using self-administered Likert-based questionnaire ranging from strongly disagree (1) to strongly agree (5).

Reliability of data has been measured through Cronbach’s alpha. SPSS-20 has been used for reliability, correlation analysis and regression analysis. Regression analysis has been used to find out the influence of perceived benefit, perceived ease of use and perceived benefit on online stock trading behaviour.

**4. Result and Discussion**

The main objective of the study is to examine the perceived benefit, perceived ease of use and perceived benefit on online stock trading behaviour. The following analysis are being conducted to test the validity, relationship and influence between the variables.

**Table No.1- Reliability Analysis:**

Scale	Items	Cronbach’s Alpha ( $\alpha$ )
Perceived Benefit	6	0.787
Perceived Ease of Use	4	0.834
Perceived usefulness	5	0.817

Online Stock Trading Behaviour	6	0.887
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**Source: Primary Data**

The reliability analysis for all the constructs showed the Cronbach’s alpha values ranged from 0.787 to 0.887. All the constructs indicate alpha point above 0.7 (Nunnaly, 1978). This demonstrates that all the research variables Perceived Benefit ( $\alpha = 0.787$ ), Perceived Ease of Use ( $\alpha = 0.834$ ) and Perceived Usefulness ( $\alpha = 0.817$ ) and Online Stock Trading Behaviour ( $\alpha = 0.887$ ), were internally consistent and had the acceptable reliability values. All items for the constructs were assessed using a Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree)

**Table No. 2- Relationship between perceived benefit, perceived ease of use and perceived usefulness on online stock trading behaviour**

Variables	Perceived Benefit	Perceived Ease of Use	Perceived Usefulness	Online Stock Trading Behaviour
Perceived Benefit	1			
Perceived Ease of Use	.742**	1		
Perceived Usefulness	.856**	.834**	1	
Online Stock Trading Behaviour	.825**	.777**	.901**	1

**Source: Primary data**

Online stock trading behaviour is positively related to perceived benefit ( $r = .825$ ), perceived ease of use ( $r = .777$ ) and perceived usefulness ( $r = .901$ ) at  $p < 0.05$ . The bivariate correlation between the variable representing a strong and significant positive relationship, which explains that extent perceived benefit of trading online, ease use of online trading system and perceived usefulness of online trading system positively influences the online stock trading behaviour of investors.

**Table No. 3a: Predictors of online stock trading behaviour**

Model Summary				
Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	.865a	.853	.848	.43167
a. Predictors: (Constant), perceived benefit, perceived ease of use and perceived usefulness				

**Source: Primary Data**

The regression model in the table 3a shows that 84.8percent (Adjusted R Square 0.848) of the variability in online stock trading behaviour is due to variability of perceived benefit, perceived ease of use and perceived benefit meanwhile the remaining 15.2 percent was due to other variables which are not included in the objectives of the research study.

**Table no. 3b: Predictors of Online stock trading behaviour**

<b>Coefficients<sup>a</sup></b>						
<b>Model</b>		<b>Unstandardized Coefficients</b>		<b>Standardized Coefficients</b>	<b>t</b>	<b>Sig.</b>
		<b>B</b>	<b>Std. Error</b>	<b>Beta</b>		
1	(Constant)	.967	.078		.866	.228
	<b>Perceived Benefit</b>	.911	.075	<b>.868</b>	13.191	<b>.000</b>
	<b>Perceived Ease of Use</b>	.885	.083	<b>.737</b>	6.746	<b>.000</b>
	<b>Perceived Usefulness</b>	.706	.153	<b>.793</b>	17.313	<b>.000</b>
a. Dependent Variable: Online stock trading						

**Source: Primary Data**

In the above table 3b, the Beta under standardised coefficient of all the predictor variables showing strong and significant predictive ability on the online stock traders. This means that perceived benefit ( $\beta=.868$ ), perceived ease of use ( $\beta=.737$ ), perceived usefulness ( $\beta=.793$ ) makes the significant contribution to explain the online stock trading behaviour. Hence, it can be inferred that, perceived benefit of cost advantage, perceived ease of use due to its ease accessibility, available information and convenience of online trading significantly predict and form as a basis for adoption of online stock trading behaviour.

## **5. Conclusion:**

Online financial services are in trend and advancement in smart phone technology have completely changed the investor behaviour towards stock trading. Youngster have greater access to smartphone and technology savvy that attracts young investor to make more money. This study explores the factors that influences the investor investing in stock market. It employs the three variables like perceived benefit, perceived ease of use and perceived usefulness that influences online stock trading. The empirical result show that the perceived benefits, perceived ease of use and perceived usefulness have positive influence in online stock trading. This indicates that the advancement in the technology has simplified the day-to-day operation and made easy to access financial services in the tip of the fingers of investor and which facilitated the investment behaviour. This study explored the effect of perceived benefit, perceived ease of use and perceived usefulness on online trading behaviour which may act as a major limitation for the study because there might be many other factors not studied in this paper may also contribute on the investment decision. Additionally, the study has been restricted to only Bangalore region, perception and experiences might vary with geographical

and economic differences. That implies that the findings of the study may not be generalizable to other part of country.

## 6. Appendix A: Questionnaire items:

Sl. No	Construct
1	Perceived benefit (Lee M(12))
a.	Using online stock trading platform will minimise transaction costs.
b.	Using Online stock trading platform will minimise travel cost.
c.	Using online stock trading platform will minimise communication time.
d.	Using online stock trading platform will minimise search time.
e.	The transaction speed of online stock trading platform is very fast
f.	The information transacted through online stock trading platform is accessible and transparent.
2	Perceived ease of use(Gefen(3))
a.	A online stock trading service is easy to use.
b.	Not much mental effort is applied when using online stock trading platform.
c.	The interaction with a online stock trading service is flexible.
d.	I am eager to learn online stock trading platform because it is easy.
3	Perceived usefulness (Gefen (3), Lee M(12))
a.	Online stock trading service is useful for searching stock information.
b.	I use online stock trading platform to enhance my skills in stock trading.
c.	Online stock trading service provides me valuable information regarding stock investment opportunities.
d.	The use of online stock trading platform can help to increase the transparency of financial markets.
e.	Using online stock trading platform can help to facilitate transactions.

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# A review of Voice-based Search Optimization and its impact in Digital Marketing

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## **Abstract:**

*The aim of this research paper is to review the voice based searches which we look in most important i phone application "SIRI" and android phones "Google voice assistant" and "Alexa" the amazon product, these are voice based assistants and works on voice command. This had lead to a change in traditional way of searching by typing search in browser in search engine, which has a huge impact, on search results being delivered by search engine. This has changed the trend of marketing from traditional marketing techniques to digital marketing techniques that has been employed by various and different websites to get traffic and or do their branding or promotions.*

*Search engine optimization is important these days as people are often using search engines to look up for products, services, and information on the Internet. The most recent advancements in artificial intelligence (AI) and machine learning have had a huge impact on how consumers use their smart gadgets and search the internet in general. Voice search optimization is the process of optimizing your pages to appear in voice searches. When you optimize for voice search, you optimize for the way people conduct verbal searches. Voice assistants (VA), iPhone use "SIRI", android phones use "Google Voice Assistant" similarly Amazon products use "Alexa". All these applications have one thing in common. They are voice-based assistants and help you based on your voice commands. Now with the speech to text technology advancement and improvements, and the devices processing powers improving, these voice-based assistants have become a go to option for most of the tasks.*

## **Keywords:**

Internet marketing, digital marketing, voice search, web, digitization, voice assistant

## **1. Introduction:**

In today's digital world, people are swiftly moving away from reading text with their eyes and swiping with their fingers toward interacting with the world using their voice and ears to talk and listen. The latest developments in Artificial Intelligence (AI) and machine learning have significantly affected how people use their smart devices and search the web.

Voice assistants (VAs), such as Alexa by Amazon, Google Assistant by Google, Siri by Apple, and Cortana from Microsoft, are computer programs that support users by answering questions and executing tasks. Quite often referred to as virtual assistants, smart personal assistants, or automated assistants. The idea of voice assistants is rather new. Before, humans dealt with computers using a keyboard, mouse, monitor, or touch screen. Voice technology now enables people to interact with the digital world by speaking (Shih and Rivero, 2020).

Voice seems to be more natural, quicker, and is positioned to take over the internet from inside the people's personal space. It is reasonable to assume that if young families which are early adopters, adopt voice, the whole consumer climate is expected to shift. The way customers engage with brands is about to undergo a significant change (Huisman and Huisman, 2018).

While voice search has been around since the early 2000's, many are beginning to use voice commands to search for information on their mobile device. Voice search is an easy and innovative way of searching for information and contains strong appeal for many people. The Internet marketing field has blossomed into a diverse search engine optimization industry enveloped in text-based requests, to search engines, and then, to virtual assistants. Thus, digital marketers have to change their strategies and implement voice search into search engine optimization by relying on questions instead of keywords (Nyagadza, B., 2020). Also, many speech technologies are widely available on the software markets. There are now more companies optimizing for voice search, and each one is becoming more competitive (Nyagadza, B., 2020).

Voice search figures show that one billion searches are made each month solely by voice.

- By 2020, voice search will be 50% of all different types of searches.
- 55 percent of households will own a smart speaker by 2022.
- 20% of smart phone requests are now being conducted with voice search.
- Around 40 million people in the U.S. own a smart speaker.
- 58% of people have used voice search to obtain information about local shops.
- 72% of people who have knowledge of voice search are saying that voice search has been part of their everyday routine.
- 43% of smart speaker owners use smart speakers to review emails, shop, or order food (Metev, 2020).

According to Pophal, 2020, voice search engine optimization is expected to grow in the near future, led by the emergence of voice search apps such as Amazon's Echo and Google's Home. Voice search is a big trend in 2020 and beyond. Keywords that are lengthy are gaining in popularity. Optimizing for voice search content will benefit companies in the months and years to come. Since they are easy to use, users prefer to use voice search to find urgent answers to their needs. COVID-19 has only affirmed this expectation as e-commerce has proved to be one of the few businesses flourishing in the current business climate.

With the increasing use of voice search, digital marketers should consider implementing slightly different Search engine optimization (SEO) techniques from the outset, when beginning to plan and create content for internet websites, social media, and product marketing. This is a significant discussion point as the use of digital assistants will expand and become more popular to the larger population over the next few years. There is a need for a better understanding of opportunities and challenges that it will present to marketers



## **Literature Review:**

Search Engine and SEO Search engines are software programs that utilize algorithms to locate and gather data about web pages (Giomelakis and Veglis, 2015). Search engines use 'robots' and 'spiders' to crawl through websites in order to build a searchable collection of information. When users conduct Internet searches, the information is saved and retrieved in milliseconds. The pages that are displayed to the searcher are referred to as Search Engine Results Pages (SERPs) (Hanlon, 2019).

Google is the dominant global search engine, accounting for more than 80% of desktop global searches, according to various sources. Bing, Yahoo!, Yandex, and Baidu are some other search engines with a lower market dominance (Hanlon, 2019).

Search engine optimization is a popular concept among marketers. Marketers benefit from SEO because their advertising are exposed to the relevant people at the appropriate time and in the right places.

Marketers can improve their advertisement's rating on search-results pages by enhancing its quality rating, which makes it more relevant and thus more search engine friendly (Bhandari and Bansal, 2018).

The researcher found that SEO is the most effective method of gaining market share and enhancing the product's brand equity, accompanied by other aspects such as product awareness, buying persuasion, and consumer insights.

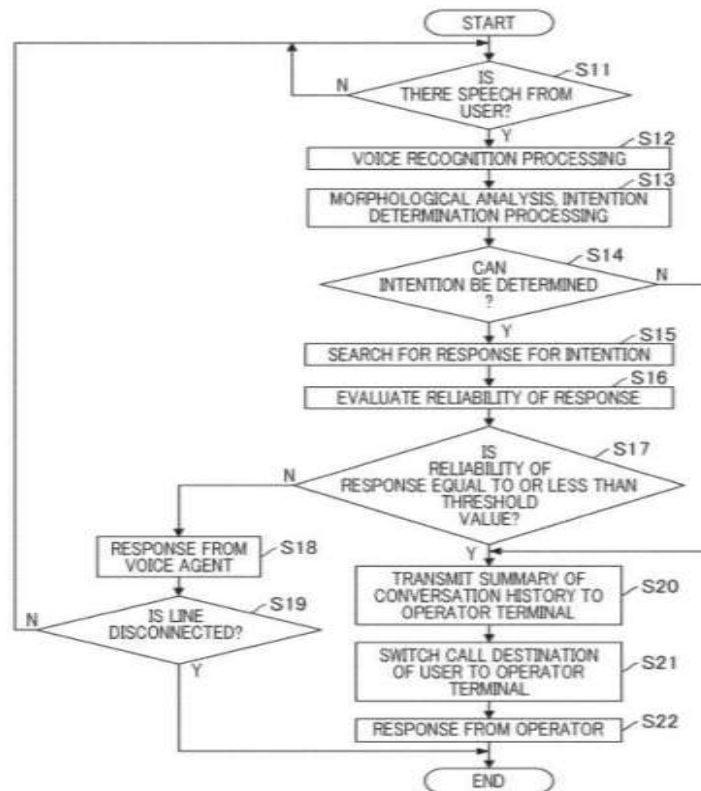
Therefore, search engine optimization (SEO) can be defined as a marketing strategy that aids in increasing the visibility of a company's website. Companies strive for higher rankings for their websites since the more frequently a site appears at the top of the search results list or at the top of the page, the more likely users are to visit it (Khraim, 2015). increasing traffic by raising company website's visibility in search engine results pages (SERPs) can be done using organic or sponsored tactics.

Organic means applying natural measures to improve site visibility, rather than using a pay-per-click provider (Shenoy and Prabhu, 2016).

## 2. Defining Voice Search:

Voice Search can be defined as a technology which uses speech recognition and natural language processing for searching the intended outcome. (G. Weinberg, 2018). Users can easily acquire accurate and clear answers, which often can be read back to them. This software can be found on computers, tablets, smart phones, TV's, Smart Watches and specific Voice equipment. (A. Jonkers, 2018). Most common digital assistants which use Voice Search are Amazon's Alexa, Google Assistant, Microsoft's Cortana and Apple's Siri (B. van der Meer, 2018).

These devices use advanced speech recognition to process and transcribe human speech into text. Artificial Intelligence Software analyses the text to detect questions and commands. After figuring out what the intent is of the user through machine learning, it connects to external data sources such as search engines to find relevant information. This information will be translated into a digestible format to fulfil the users intent (H. Kiran & H. Nikolovska, 2018).



**Figure 1. Voice Recognition System by K. Suzuki (2019)**

### 3. The rise of voice search

Despite the fact that the media tends to ascribe the claim to ComScore, the research firm never predicted that by 2020, voice will account for 50% of all searches.

Nevertheless, it is estimated that around 250 billion voice searches take place each year. It was discovered that the 50% represented visual search as well.

According to Google's prior estimates, voice search accounted for around 13% of total voice search traffic and 20% of mobile search traffic in 2018. Google reported 2 trillion total searches in 2018, implying that over a quarter trillion voice searches were performed. Regardless of these inflated estimates, over 250 billion voice searches in a single year is a significant number.

According to Voice-bot consumer survey data, voice search is widely used now and will continue to grow in popularity. In 2017, there were 33 million voice-activated products on the market, with 40% of people using them daily (Wood, 2018).

According to a survey conducted by Swayne 2018 on the usage of voice search, 25% of the UK and German populations use speech to interact with devices, increased from 15% in June 2017. Speech interaction is more common in France, with 32% of individuals claiming to use voice to communicate with electronics. About 15% of the UK population uses voice on a daily basis.

In the UK, France, and Germany the most popular device for voice interactions is Smart phone, 60%, 71%, and 78% respectively. People who use voice, 27% use Amazon Echo or Google Home (Swayne, 2018).

## 5. How VSO is different from SEO

The length of the query Searches carried by speech are different from those performed by typing. According to a research done by Search Engine Watch, voice searches take twice as long on average as text searches (Tabeling, 2014).

The number of words in the query was used to determine its length as reported by Guy, 2018 One-word requests were found to be especially unusual on voice (12.2 % vs. 21 % for text). Furthermore, only 21.2 % of text questions had more than five words, whereas 34.5 % of voice searches had more than five words. The difference in length between voice and text questions has a significant impact on query language. This contrasts with voice inquiries being longer in that it has more repetition for shorter questions. This discovery is thought to be the result of two major factors.

First, smaller query variation in voice search defines search in its early phases, as it has in online and mobile search. Secondly, using abbreviations, spellings, and punctuation marks, increases text queries. First, smaller query variation in voice search defines search in its early phases, as it has in online and mobile search (Guy, 2018).

**More Conversational :** According to Wood, B., 2018 voice assistants are spoken to as though they are close friends, according to 41% of persons who use them.

As an illustration, if a searcher is looking for locations to buy pizza in London, they simply type in "Best Pizza in London." Some people, on the other hand, tend to naturally become more conversational when utilizing voice search. And questions go like this instead "Where in London can I get the best pizza?" or "Can you tell me where the closest pizza places are?" Stronger intent Natural speech expresses intent more forcefully.

In the event that a searcher were to do a search for "digital camera," you would have no way of knowing whether the searcher was wanting to purchase a digital camera, get one fixed, or was merely browsing for stock photos of cameras. However, we have no indication if this searcher is looking to buy or is just doing research based on these phrases. This is where natural language use changes it all in the conversational query (Virji, 2016)

## 6. Voice search Optimization

When it comes to voice search, people ask more inquiries and use a wider range of terms. Voice search is an excellent tool for boosting organic traffic from search 14 results and expanding the keywords to include specific and more complicated questions is a crucial first step (Keensights, n.d.).

Google is becoming competent at evaluating the voice query context. It is essential that business content addresses inquiries about their objectives, challenges, and specific problems from their potential consumers.

Additionally, voice search optimization enables businesses to acquire a better understanding of the purpose and motivation for a user's search query, which is essential for acquiring insight into the target demographic (Keensights, n.d.).

Location is a significant element in voice search SEO. At least once a week, 76 % of smart speaker owners conduct a local voice search. Consumers utilize their voice assistants to learn about shop location, hours of operation, and product inventory. It is critical to optimize company content for both general query search results and local search results (Keensights, n.d.).

## 7. Conclusion

Voice assistants have been increasingly used throughout the world in recent years. More businesses are incorporating voice assistants. As a result, interactions between users and voice assistants are rising. Analyzing consumer behaviour revealed whether firms should prioritise voice search optimization and how those already optimized for voice are affected. This would imply that retailers, followed by entertainment businesses benefit the most from immediately optimizing their websites for voice search. However, when compared to individuals who use their voice search device for personal reasons, these figures are far lower. Due to the limitations present in these voice assistants, people are hesitant to employ them for shopping purposes. This would impose constraints on businesses who have optimized for voice search or are planning to optimize.

## 8. Recommendations for Future Research

Future research in the near future may focus on doing a comparative study to find out whether voice assistants have grown in prominence and shopping using voice has also risen in relevance. These findings might be useful in confirming certain future predictions that researchers can only make based on their current knowledge. Furthermore, researchers may be interested in a follow-up study that focuses more on the qualitative aspects of the matter. The research may include focus groups and interviews with actual voice assistants to investigate why, how, and when voice assistants are used.

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## Leader's role in creating future learning organizations

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### **Abstract:**

*Success today requires the agility and drive to constantly rethink, reinvigorate, react, and reinvent. Bill Gates*

*The recent pandemic has created a massive disruption in the way organizations function. This change also created a need for leaders to change the way they are used to exhibiting their leadership behaviors. This has provided an opportunity for leaders to adapt to an increasingly dynamic organizational & business environment by adopting new ways of working and leading.*

*This made way for more leaders to embrace change and look towards enhancing their leadership agility levels for the benefit of organizations. Leaders with enhanced leadership agility levels help teams and organizations thrive & excel by showcasing 3 key attributes – Flexibility, Adaptability, and Responsiveness.*

*Global leadership research combined with leadership case studies has concluded that one of the primary characteristics of great leaders is Leadership Agility. This characteristic is the building block for creating a learning organization.*

**Keywords:** Agile, Agility, Self-managing teams, learning organization & Leadership agility

Details of research methodology

- The study uses the quantitative approach for research.
- The data collected using structured questionnaires from agile teams
- The sample size (Convenient sampling) consists of approximately 15 IT companies
- People across teams playing different roles are included which allows diverse opinions & views across organizations.
- Total of 450+ responses collected as part of primary data collection
- SPSS & AMOS tool is used to consolidate the statistical analysis & generating the outputs

## Retrospectives helps to build continuous improvement culture in agile teams

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### **Abstract:**

*A retrospective's huge potential for learning should not be off-limits to any team member. - Luis Goncalves*

*Agile is the way we look at things happening around us, understand how we are impacted, and be able to respond to the change to thrive & excel. Agile is a behavior pattern, how you look at the world's complex situations, how you react to situations, how you visualize a solution, how you reach the solution, continuously learn, and evolve. You can either think of a complex problem or a situation and worry about it or you can break that into meaningful small chunks & try to solve it. Agile adds that fun element of tackling smaller challenges systematically.*

*The retrospective is an opportunity for teams and the organization to reflect on what has happened and to build new ways to become better moving forward.*

*In other words, retrospectives are a chance for teams and organizations to inspect and adapt moving forward to create a continuously improving organization.*

*Team & organization retrospectives create actionable learning. Retrospectives help organizations to acquire new knowledge which in turn builds a learning organization. By Team Learning, gaining knowledge, and upskilling the organization is prepared for disruption.*

**Keywords:** Agile, Agility, Self-managing teams, continuous improvement & Retrospective

Details of research methodology

- The study uses the quantitative approach for research.
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## Industry 4.0 Redefining Globalization

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### **Abstract**

*The emergence of new age technologies is no doubt is instigating a new era of global supply chain network that are less inter-dependent and de-centralized both on the level of respective domestic oligopoly and less connected among nations even with those who share the similar political, lingual & cultural similarities. Post the GFC (Global Financial Crisis) in 2007-09, the idea of globalization took a new turn from an open less restricted global market to a cautious and suspicious SCM networks (Roberta Stanef 2010). To make things more challenging for the new world order, the collection of customers data that are treated as an assert in this era because of which countries across the world now are implementing strict data controls that can flow between national boundaries (N Purtova 2018).*

*Today as we are in the phase of the implementation of many revolutionary technologies across the industry those are primarily based on digital world, it's very important for MNCs & governments to understand these new geopolitical dynamics in order to maximize the benefits of the future where data is the new global currency (WEF-Natarajan Chandrasekaran 2015). The great firewall of China is the best example of the great potential in this in Industry 4.0 (Skipper, Ben (7 December 2015).*

*The aim of the present study is to align this new world order in the prism of Microsoft Scenarios and how the new world order is going to emerge in this era. The research design is descriptive come exploratory in nature. A secondary data and review of current academic and industry research is utilized to construct an overview of changing nature of data privacy law for India in the future. The study concludes by providing some important insights for India on the effective methods of safeguarding the end consumer data.*

**Key Words-** Industry 4.0, oligopoly, National Boundaries, Data, Data Privacy Law, New world Order.



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