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## **THE QUINTESSENCE OF HUMANITY: AN EXISTENTIAL PP 2.0**

### **READING OF CAMUS' *PLAGUE***

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#### **ABSTRACT**

Existentialism is a form of metaphysical inquiry that reconnoitre the problem of human existence where human beings formulate meanings through their actions and interpretations in an apathetic and enigmatic universe. It postulates that it is up to the individual to make meaningful and authentic choices despite the existence in an irrational universe. Albert Camus, one of the stalwarts of Existentialism, through his oeuvre, delved deep into its various dimensions, the different facets of the human corporality, and meaning in life and death. These Existential questions have been deliberated upon incessantly during the Covid-19 occurrence. People in the times of Covid-19 pandemic had to grapple with multifarious misfortunes and terrifying ordeals such as agonising bereavements, confinement and lack of physical proximity, loss of employment, source of income, and financial stability. A life bereft of dreams and aspirations, accompanied by fragmented presumptions had to be dealt with. Human vulnerability and noxious dependency had to be overcome by reinforcing hope and resilience. This study is an attempt to explore Albert Camus' work *Le Peste* with special emphasis on how to have a different perspective of life and death and lead a life which is significant in trying times in the light of Paul Wong's 4 pillars of Existential PP2.0 theory, namely virtue, meaning, resilience and well-being.

The first Positive Psychology (PP1.0) movement which was initiated by Martin Seligman in 1998 laid emphasis on the positive notes in life. The Existential Positive Psychology (PP2.0) approach developed by Paul Wong over the last decade intended to combine the best from existentialism and positive psychology for the progress and prosperity of humanity. It furnishes successful strategies, coping techniques and resources to deal with apprehensions, dissolutions and despondency. Wong emphasizes that to increase emotional health, wellness and the quality of life, individuals need to realise and acquiesce that life involves pain and suffering and reshape these entities to create tenable mental health and well-being. According to Wong this acceptance can be achieved only when pain, suffering and despair are experienced, analysed and assimilated.

Adversities and the struggle to emerge triumphant have formed the key stone of human culture for the centuries past; 'pandemic outbreaks' serves as reminders for the same. The epistemology of Camus can be reassessed through the lens of Existential PP2.0 to develop a dispassionate and innovative approach to challenge and deflect the intrinsic fear, angst and desperation for the eventual triumph and perseverance, that human tenacity has always been adept at.

**Key words: crises, Existentialism, Existential PP 2.0, Pandemic**

## **INTRODUCTION**

A scenario where the populace is confined to the four walls of their homes, as a contagium spreads, infecting thousands in its wake, killing millions across the globe, and subjecting even more to quarantine was inconceivable in the dawn of 2020. How to keep the spirits up and survive if an epidemic creates havoc in the daily life, shutting down educational institutions, crowding hospitals, and putting all the social affairs including weddings and funerals, sports calendars, festivities and itineraries on indefinite hold was implausible. Human beings becoming nothing more than a helpless spectator in the face of impending catastrophe was an idea that was as improbable as it was far fetched.

Albert Camus answered these questions through his detailed and realistic portrayal of the lives of people battling a bubonic plague in the Algerian city of Oran in his novel *The Plague*. This book demands our attention as human beings are challenged to the very core both physically, socially and emotionally in these unprecedented times. Man, a slave of habits,

who finds comfort in the routines of life has been forced to face a reality which is as undefined as it is unsettling. Published in 1947, it is a tale of human resilience in the face of unmitigated terror. It etches the political, economic and religious scenario during an epidemic in detail through the eyes of a narrator who remains unknown till the beginning of the last chapter.

Camus researched and examined the historical account of plagues to lend authenticity to his work. He explored the details of the Black Death in the 14th century where 50 million were laid to rest, the Italian plague of 1630 where the fatalities crossed 280,000 across Lombardy and Veneto, the great plague that wrecked the city of London in 1665 as well as plagues that brought devastation to the cities on China's eastern seaboard during the 18th and 19th centuries. Covid 19, horrific, merciless and widespread as it is, should be considered to be comparatively an event of no great magnitude in the chronicles of global pandemics.

*The Plague* contains the familiar scenario: the disavowal at the outset, the administration caught off guard by the enormity of the task ahead, the futile efforts to draw a veil over the catastrophe to safeguard the tourism industry and the financial fabric of the area, perfunctory and erroneous attempts to curtail the escalation of the disease. It is the story of a few disparate individuals who struggle to find means to cope with the epidemic, particularly the principal character of *The Plague*, Dr. Bernard Rieux, 35 years old, unassuming, pragmatic and altruistic, as he moves from patient to the other trying to heal those who can be restored to health and alleviate both the physical and mental agony of the remaining.

The novel begins with Dr. Bernard Rieux who finds a number of rodents dead and in the jaws of death on his way to his residence. Inside the homes and outside on the streets, the town of Oran, on the coastline of Algiers witnessed the eerie sight of the rodents' deaths. Initially the numbers were small but within a short span of time the numbers ran into thousands. The evening papers reported the matter with great zeal. The citizens too demand action from the Government. After initial reluctance, the authorities of Oran are forced to take measures. It was decided to remove the dead bodies of rats at daybreak and then to burn it in the town incinerator. Then the human beings began to die.

The virulent spread of the disease through the population is abetted by the apathy, lassitude and duplicity of those involved. Stores, factories and businesses are compelled to shut down, streets empty of the usual din and buzzle of everyday life. But the infection shows no signs of

subsiding, infecting the multitudes and permeating all parts of the town producing a death toll that is steeply on the rise. The people of Oran seem unwilling to accept this. They try to evade the reality of what is happening around them. Even when multitudes of the city are sick and dying, they are those who believe that it will leave them untouched. They are modern people enjoying the benefits of the advances in the field of science and technology. They are surely not going to share the fate of the unfortunates of London and Canton in the 17<sup>th</sup> and 18<sup>th</sup> centuries.

The sense of isolation and loneliness prey on the minds of everyone in Oran. Scarcity of medical supplies and lack of medical facilities add fuel to the fire. Father Pameloux, a priest who delivers a harangue as the plague being the punishment from God draws large crowds as terrified citizens seek solace. Raymond Rambert intends to get away from Oran to reunite with his partner who resides in Paris, but the city's officials doesn't grant him permission to leave. He tries to get away by unlawful means. Rambert draws up his escape plan, but is distraught when he realises that Rieux is separated from his wife too. He refuses to leave and decides to join hands to battle the scourge. Cottard has existed in perpetual dread of imprisonment and castigation because of a crime committed by him in the past. He embraces the plague epidemic with ardour because he is no longer lonesome in his dreadful misfortune. Jean Tarrou, an innocuous visitor is fascinated by the people of the town. He notes down his observations in his diary. Later, he mobilises the people to form a volunteer group to fight the epidemic.

The city grows violent, and finally civil rights are suspended and martial law sanctioned. The overcrowded hospices and graveyards compound the horror of the existing scenario. The deceased are interred without any the pomp and ceremony. The main focus is on getting their remains into the ground without any delay or display of emotions. The feelings of the relatives were hurt by the lightning speed of the funerals. The situation took a turn for the worse when two pits were dug in the cemetery, one reserved for men for men and the other for women. The sense of propriety and decorum vanished when men and women were thrown into the pits.

Camus understood how a universal catastrophe acts as a sieve over humanity, through which the most startling and extraordinary behaviour come to light. Some plunder and loot; a handful exhibit an inconspicuous capacity for selfless heroism. The various characters react in their own ways. Rieux who could hear "the whispering of the plague"(Camus,50) refuses

to philosophise, carrying on with dogged determination. Then there is Tarrou, a keen observer and a perpetual analyser, the one who must always search for the why. His strong sense of social responsibility is evident in his efforts to fight the plague. There is Rambert, the journalist who longs to escape the city and reunite with his lover. A priest delivers a diatribe, the newspapers invents counterfeit measures. The public irrationally rifle through various moods: abnegation, alarm, a growing sense of apprehension, sudden gusts of veneration, followed by gusts of reckless abandon. Eventually, the town lapses into a kind of collective despondency:

Thus in a middle course between these heights and depths, they drifted through life -rather than lived, the prey of aimless days and sterile memories, like wandering shadows that could have acquired substance only by consenting to root themselves in the solid earth of their distress.(Camus,35)

The anti-plague efforts do not decelerate the unrelenting march of the epidemic. However, Camus' novel declares that the efforts to curb the disease is nonetheless a righteous, significant struggle even if it means facing interminable defeat. In this way, *The Plague* is imbued with Camus' unwavering faith in the value of hope in times of despair. Everyone who decides to fight the epidemic, to challenge death, knows that their endeavours increase their plausibility of being afflicted by the plague, but they also realize they could still be infected by the plague if they did nothing at all. They seem to understand the fact there whatever measures they adopt may not be enough to keep them safe. In the face of such a course of action seemingly illogical and nonsensical, between death and death, the fact that they make a choice not to surrender, to stand up and fight for themselves and their community becomes even more relevant. It is through this act of defiance that human beings become worthy of who they are.

Dr. Rieux presents an impartial account of the events without trying to paint himself in a good light. The crux of the book lies in the final statement of Dr. Rieux who concludes the story with the irrefutable fact that there found more to admire than despise in the people of Oran during the plague. "In fact there is more good in humans than bad", says Dr. Rieux.(Camus,64) The doctor works resolutely to alleviate the pain and suffering of those around him. But he is not a heroic figure. "This whole thing is not about heroism," Dr. Rieux says. "It may seem a ridiculous idea, but the only way of righting the plague is common decency."(Camus,81) When asked what decency is "Doing my job," the doctor replies.



Camus's account reveals our contemporaneous cognizance with the notion of how our lives with all the joys, sorrows and aspirations become irrelevant instantaneously when faced with a scourge that spreads with a startling swiftness, inconveniently interfering with our daily routines. But above everything else Camus emphasises that we can never foretell or be totally prepared to face a pandemic. Suffering becomes indiscriminately distributed, everyone striving to escape the fates of an unfortunate destiny. Camus speaks to us in our own times not because he was a clairvoyant who could envisage what the experts in the field of epidemiology could not, but because he accurately observed human disposition. He knew, as we do not, that "everyone has it inside himself, this plague, because no one in the world, no one, is immune."

It is believed that life is basically tragic and much of human suffering is existential. Human beings are born alone, struggle alone and die alone. A sense of existential loneliness pervades human existence due to the lack of connection and harmony within oneself and with others. Real happiness in life can be attained by addressing the fundamental disharmony and disunity. Existential PP 2.0 aims to study and understand how to navigate and approach the bright and dark sides of human life and situations for optimal well-being to bring about unity and balance in all spheres of existence. It guides us to survive and thrive in the midst of tensions between good and evil, hope and despair, love and hate, courage and safety. It is about coping, dreaming and transcending. It is the mature positive psychology of how to live well and die well in spite of the conflicts and tensions that pervade human existence.

History has provided ample proof of the remarkable human resilience time and time again. Many theories in psychology discuss about coming to terms with the 'inevitable death' a technique that is hard to master. The 'absurd behaviour' can be modified into a rational one in the face of stress, loss, suffering and death (Tomer, 1992). The 'death threat' need not always be discerned as abominable. Transformation of behaviour towards optimism, adaptability and personal development can be achieved through resilience and acceptance. New perspectives of the crisis can definitely bring about an improvement in the functioning and quality of life at such times. The acquisition of new skills from the lessons learnt after each crisis and the resultant positivism needs to be assimilated in our daily life. Sadly, it takes another menace of great magnitude to make the world realize that it is vulnerable and bring back the innate fear, that stays camouflaged in the vague delusion of invulnerability.

Even in the face of COVID-19, the situation has improved when the mandates of global health agencies were followed and behavioural responses organized by practising social distancing. Self-care can facilitate care for others, exercise can improve health and mindfulness can help us introspect. The commitment to the society helps in taking care of the marginalized, fosters growth and prevents stigma. Based on positive psychology research, 'death threat' during a disaster can also lead to new avenues and goals like creativity, generativity, solving existential questions like the purpose of life, higher standards and personal growth oriented behaviour, all of which are for the 'healthier change'. (Wong and Tomer 2011)

In several of his works Camus touches on PP2.0 concepts such as virtue, practiced through the morals and values, meaning attained through the acceptance of inherent meaninglessness, resilience found in single and collective efforts and well-being specially in terms of happiness and delineates the concepts in a discursive way within the reality of life and death. Virtue, meaning, resilience and well-being are highlighted by Wong as the four pillars of PP2.0 in times of Covid-19 to address issues pertaining to mental health. Meaning is considered as an important aspect of well-being, happiness and as part of a good life (Wong, 2015, 2020a,b). Camus, however, does not see an inherent meaning in life, pointing instead to the need to accept the absurdity of life and noting that happiness and joy can be experienced independently of life's meaninglessness.

Camus is often portrayed as an existentialist who refuses to see life as something meaningful, as a person who considered life primarily as something senseless, absurd and essentially meaningless, but also as someone who understood how to create meaning and happiness in a fatuous world. Camus generally recommends that humans should concentrate on ascribing meaning to life rather than death. However, he understands that the overall meaninglessness in life needs to be recognised, accepted and overcome by finding joy in life thereby making it worthwhile. The only meaningful ascription to the death is that human beings share a common destiny which is inevitable. Camus proposes the acceptance of life as meaningless to overcome the fear of death rather than a continual search for its meaning. Life becomes meaningful only when it is lived. It might be assumed that his radical approach to life's absurdity could also be an subconscious strategy to conquer and get past the anxiety of death. Such trials and tribulations as those experienced during Covid-19, can act as a catalyst for human beings, in the face of death, to redeem and reform.

## CONCLUSION

This study is an attempt to provide individuals who underwent innumerable suffering during the pandemic - with all its losses, deaths and the inherent meaninglessness—with the idea that while the meaning behind this senseless suffering might be unfathomable, it demands a radical compliance, as well as transcendence, new centre of focus and a redesigned perspective towards life and happiness. It calls for deliberate and voluntary meaning-making in the face of unmitigated suffering. *The Plague* is a study of the endurance and triumph of man in challenging times navigating uncharted waters. Undoubtedly, this lockdown has forced us to introspect on our actions and its consequences. It has raised pertinent questions about the priorities in life and helped to redefine relationships. Although man should not held responsible for the outbreak of the plague, we are liable for the response to it. The biopsychosocial damage caused by COVID-19 cannot be reversed. As the world slowly limps back to normalcy, like *The Plague*, let the story that is written be that of fortitude, salvation and regeneration and not that of melancholy, sorrow and anguish.

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## **STUDY ON CUSTOMER ENGAGEMENT ON SOCIAL COMMERCE PLATFORMS**

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### **ABSTRACT**

The popularity of social networks such as Facebook, Twitter and Instagram have created opportunities for new online business models. Among these, social commerce is a combination of two digital trends- ecommerce and social media. Social commerce is a next generation trend that will reshape the future of commerce. The rise of social commerce eliminated the limitations of ecommerce. However, social commerce is still in the infancy stage. So, there persist some issues on purchasing through social commerce which are yet to be resolved. There are some factors which leads to the adoption of these social commerce platforms by the customers. Even though the number of social media users are quite high, but the engagement of people on social commerce platforms are comparatively lower due to some factors. The unawareness and non- engagement of people on social commerce hinders the opportunity of people for better and advanced shopping experiences. This research paper aims to outline the factors influencing the adoption of social commerce platforms by the customers and the major hindrances for the etc. on social commerce platforms.

***Keywords: Social commerce, e-commerce, trust, ratings and reviews, recommendations***

## **INTRODUCTION**

The popularity of social networks such as Facebook, Twitter and Instagram have created opportunities for new online business models. Among these, social commerce is a combination of two digital trends- ecommerce and social media. Social commerce, a relatively new subset of ecommerce is blurring the line between social interaction and online shopping. The term social commerce was introduced by Yahoo on November 2005 to describe a set of online collaborative shopping tools such as shared pick lists, user ratings and other user generated content sharing of online product information and advice, the area of social commerce has been expanded to include the range of social media tools and contents used in the context of ecommerce especially in the fashion industry. Social commerce is a new trend and refers to the application of social elements such as attention, sharing, communication, discussion, and interaction to the e-commerce transaction process. Interaction and promotion in social commerce are initiated not only by merchants, but by consumers themselves. Consumer's initiative is mainly to share recommended commodities with other consumers or potential users through social platforms. Today, comprehending consumer behaviour is becoming dynamically challenging with the emergence of social commerce. Social commerce is a more recent phenomenon and rapidly expanding in market is not been studied as extensively. Despite currently being in the infancy, social commerce is advancing at an incredible rate.

With the rise of Facebook and other social media channels, people are now spending more time than ever before using social media. Usage patterns have changed to match this continuing trend. Customers now have a stronger voice than ever before. While in the past sales used to be a consequence of mass messages spread via adverts, they are now more dependent upon building relationships with the customer. In the world of social marketing, achieving and impressing new customers has become less important as companies focus more on on-going engagement, relationships and lifetime customer value. Thus, this study is an attempt to analyse mainly the factors influencing the adoption of social commerce by customers and the major hindrances for the non -engagement of them in these platforms.

## **LITERATURE REVIEW**

Rahul Malik (2020) “Social commerce in India: Market and product study” has stated the role of social commerce and its benefits to customers and merchants. It is also been stated that by 2025, India’s e-commerce market will reach US\$ 220 billion while social commerce can potentially grow to become a US\$ 100 billion market.

Economic Times (2020) “Social commerce is redefining India’s e-commerce ecosystem” states that social commerce entails an amalgamation of the use of social media and e-commerce and its growth can be estimated with India’s vast social media user base and our growing appetite for e-commerce.

Pranit Sarda (2019) “How social commerce is changing e-tail in India” stated that unlike random pages on social media apps like Instagram, these platforms keep all the stakeholders’ interests in mind while aiming to increase the number of transactions. And unlike Facebook Marketplace, social commerce platforms also take on the responsibility to handle logistics, returns, and payments—generally COD—and any disputes.

Arunraj Rajendran (2019) “Social Commerce – The Next Billion-Dollar Market in India” stated that social Media platforms have already shown that they are heading towards creating e-commerce experience within the platform.

Rohit Yadav and Tripti Mahara (2018) “Interactions and participation on social commerce websites: Exploratory study” stated that an increasing number of organizations are adopting social commerce to engage and occupy customers in product development, sales and support activities. Therefore, it is imperative for retailers and marketers to know customers’ adoption behaviour towards SC websites and the benefits they gain through voluntary contribution of information on these websites.

## **RESEARCH METHODOLOGY**

Descriptive research is used in this study to obtain information concerning the current status of the social commerce to describe "what exists" with respect to variables or conditions. The Primary data have been collected from 100 respondents using self-administered questionnaire. The respondents were the individuals who were participating on the social



commerce platforms. The exclusion criteria were placed as “no purchases made from the social commerce platforms”. People between the age group of 20– 35 in the Chalakudy municipality were taken as the universe of the research. The technique used for the study was purposive sampling wherein the customers with the age category of 20- 35 were taken into consideration.

### *3.1 Stimuli development*

To select the independent variables and to assess the viability subjected by the authenticity of the study report, a pilot study was conducted among 50 respondents with a great deal of accuracy, followed by a well-structured questionnaire. The study, being of descriptive nature chooses to raise several opportunities for further research both from the perspective of theory development and concept validation. Moreover, subsequent research is necessary to refine, validate and further elaborate the research findings.

### *3.2 Independent Variables*

The research instrument employed in this research was a study on customer engagement on social commerce platforms. Five independent variables are taken in this day which includes gender, trust, ratings and reviews, recommendations and familiarity.

### *3.3 Dependent Variable*

Customer engagement is the dependent variable in this study. The study consists of various factors influencing the adoption of social commerce by the customers. The responses were measured on a 5-point Likert scale (5= Strongly Agree, 4= Agree, 3= Neither Agree nor Disagree, 2= Disagree, 1=Strongly Disagree). Respondents were asked to respond to the structured questionnaire using the 5-point Likert scale ranging from 5(Strongly agree) to 1(Strongly Disagree) to measure the relatedness objectives of the study and formed the hypotheses to draw a meaningful conclusion.

## DATA ANALYSIS AND INTERPRETATION

### Section I

#### Reliability test using Cronbach's Co-efficient

Table 1: Cronbach's Co-efficient

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.637	0.637	5

Item Statistics			
	Mean	Std. Deviation	N
Recommendations from friends and relatives are the most credible form of advertising among customers	3.93	0.859	40
Ratings and reviews given on social commerce platforms are reliable	3.53	0.905	40
Gender influences on customer engagement in social commerce platforms are high	3.30	0.853	40
I do not doubt the authenticity of these platforms	3.25	0.707	40
I am familiar with purchasing products from social commerce platforms	3.90	0.778	40

(Source: Author's Calculation)

A Reliability Test was carried out using Cronbach's Alpha, which measures the internal consistency of research constructs and the result is exhibited in Table 1. The general rule of thumb is that a Cronbach's alpha of .70 and above is good, .80 and above is better, and .90 and above is best. But, if the number of items is less than ten, an alpha value above 0.5 is also considered as having good reliability. In this research the **Cronbach's Co-efficient is 0.637**. Thus, it can be concluded that the scale has internal consistency and reliability. In other words, the items that are used in it measures what are intended to measure.

## Section II

### Chi-Square Test and hypothesis testing

The Chi-Square Test of independence has been used to determine whether there is an association between the variables (Gender and Customer engagement). It is a nonparametric test. This test utilizes a contingency table to analyse the data.

#### *Hypothesis 1*

H01: There is no association between gender and engagement of customers in the social commerce platforms. H11: There is association between gender and engagement of customers in the social commerce platforms.

Table 2 Chi- Square Test

		Gender		Total
		Female	Male	
Gender influences on customer engagement in social commerce platforms are high		35	25	60
	Agree	10	7	17
	Disagree	6	2	8
	Neutral	6	3	9
	Strongly agree	3	1	4
	Strongly disagree	1	1	2
<b>Total</b>		<b>61</b>	<b>39</b>	<b>100</b>

#### Chi-square Test

	Value	df	Asymp. Sig. (2sided)
Pearson Chi-Square	1.425 <sup>a</sup>	5	0.922
Likelihood Ratio	1.486	5	0.915
N of Valid Cases	100		

a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is 0.78.

**Interpretation:** Table 2 shows whether there is an association between the gender and customer engagement on social commerce platforms. Since the p value is greater than the

significance level (0.5), null hypothesis is accepted. So, the test proves that there is no association between the gender and customer engagement on social commerce platforms (Value=1.425, p= .922). Both the variables are independent.

### Section III

#### **B. Regression analysis and Hypothesis testing**

Regression analysis was conducted to measure the influence of Trust (T), Recommendations (R), Ratings and Reviews (Rr) and Familiarity (F) on Customer Engagement (CE). The independent variables are T, R, Rr, F and the dependent variable is CE. The main objective of regression analysis is to explain the variation in one variable (called the dependent variable) based on the variation in one or more other variables (called independent variables). If multiple independent variables are used to explain the variation in a dependent variable, it is called a multiple regression model. The output of multiple regression analysis was used to test the hypotheses.

#### *Hypothesis 2*

H02: Trust has no significant positive influence on customer’s intention to adopt social commerce. H12: Trust has a significant positive influence on customer’s intention to adopt social commerce.

Table 3 Trust factors

ANOVA<sup>a</sup>

	<b>Model</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	7.209	2	3.604	3.550	0.039 <sup>b</sup>
	Residual	37.566	37	1.015		
	<b>Total</b>	<b>44.775</b>	<b>39</b>			

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.810	0.776		4.910	0.000
I trust social commerce platforms in protecting privacy	0.616	0.258	0.491	2.389	0.022
I do not doubt the authenticity of these platforms	-0.775	0.311	-0.511	-2.490	0.017

**Interpretation:** Tables 3 represent the beta values, t values and significant values of independent variables. The independent variable T is statistically significant at 1 percent significance level as the statement one shows (t = 2.389, p = 0.022), and the statement two shows (t = -2.490, p = 0.017). It means that independent variable Trust (T) has significant positive effect on Customer Engagement (CE).

**Hypothesis 3**

H03: Recommendation has no significant positive influence on customer’s intention to adopt social commerce. H13: Recommendation has a significant positive influence on customer’s intention to adopt social commerce.

Table 4 Recommendation factors

ANOVA<sup>a</sup>

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.014	1	10.014	10.947	0.002 <sup>b</sup>
	Residual	34.761	38	0.915		
	<b>Total</b>	<b>44.775</b>	<b>39</b>			

Coefficients<sup>a</sup>

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.010	0.716		1.410	.167
	Recommendations from friends and relatives are the most credible form of advertisement	0.590	0.178	0.473	3.309	0.002

**Interpretation:** Tables 4 represent the beta values, t values and significant values of independent variables. The independent variable T is statistically significant at 1 percent significance level as the statement one shows ( $t = 3.309$ ,  $p = 0.002$ ). It means that independent variable Recommendation (R) has significant positive effect on Customer Engagement (CE).

**Hypothesis 4**

H04: Ratings and Reviews has no significant positive influence on customer’s intention to adopt social commerce platforms. H14: Ratings and Reviews has a significant positive influence on customer’s intention to adopt social commerce platforms.

Table 5 Ratings and Reviews

ANOVA<sup>a</sup>

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.730	1	12.730	15.095	0.000 <sup>b</sup>
	Residual	32.045	38	0.843		
	<b>Total</b>	<b>44.775</b>	<b>39</b>			

Coefficients<sup>a</sup>

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	1.101	.591		1.864	0.070
1	Ratings and reviews given on social commerce platforms are reliable	0.631	0.162	0.533	3.885	0.000

**Interpretation:** Tables 5 represent the beta values, t values and significant values of independent variables. The independent variable T is statistically significant at 1 percent significance level as the statement one shows ( $t = 3.885$ ,  $p = 0.000$ ). It means that independent variable Ratings and Reviews (Rr) has significant positive effect on Customer Engagement (CE).

**Hypothesis 5**

H05: Familiarity has no significant positive influence on customer’s intention to adopt social commerce platforms. H15: Familiarity has a significant positive influence on customer’s intention to adopt social commerce platforms.

Table 6 Familiarity

ANOVA<sup>a</sup>

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.190	1	1.190	1.038	0.315 <sup>b</sup>
	Residual	43.585	38	1.147		
	<b>Total</b>	<b>44.775</b>	<b>39</b>			

Coefficients<sup>a</sup>

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.449	0.876		2.795	0.008
	I am familiar with purchasing products from social commerce platforms	.225	0.220	0.163	1.019	0.315

**Interpretation:** Table 6 represent the beta values, t values and significant values of independent variables. The independent variable T is statistically significant at 1 percent significance level as the statement one shows (t =1.019, p = 0.315). It means that independent variable Familiarity (F) has no significant positive effect on Customer Engagement (CE).

**VALIDATED MODEL**

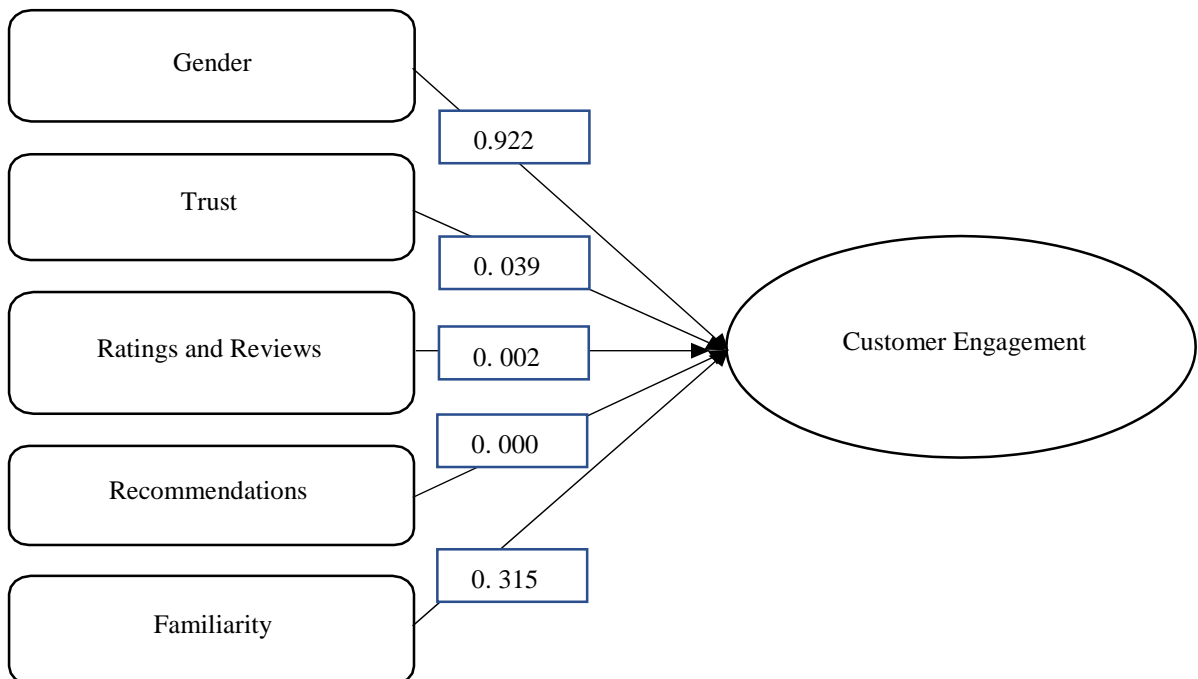


Fig 1: Validated Model



## RESULTS

The findings of the study reflect the factors influencing customer's intention in the adoption of social commerce platforms, major hindrances for the involvement of customers on these platforms etc.

- Among the respondents, 61% are female.
- 87% of the respondents are aware about the social commerce platforms.
- Only 40% of the respondents have made purchases from social commerce platforms.
- 50% of the respondents prefer fashion products more to purchase from the social commerce platforms followed by electronics.
- 50% of the respondents are of the opinion that Instagram is the most effective and reliable social commerce platform.
- The Chi – Square test proves that there is no association between the gender and customer engagement on social commerce platforms.
- Trust (T) has a significant positive effect on Customer Engagement (CE).
- Recommendation has a significant positive effect on Customer Engagement (CE).
- Ratings and Reviews (Rr) has a significant positive effect on Customer Engagement (CE).
- Familiarity (F) has no significant positive effect on Customer Engagement (CE).
- 50% of the respondents strongly agree that lack of quality assurance and certified products creates a barrier of trust and affordability for them while planning to buy the products.
- 40% agree that they trust the social commerce platforms in protecting their privacy.

## SUGGESTIONS

- Companies would need to study consumer's shopping patterns and online behaviour while analysing advanced data. This insight could be used for providing the customized experiences for the customers throughout the shopping journey.
- Choose the right social commerce platform where the audience regularly engage, generate responses and not the platform where they don't interact more.
- Focus on the target audience by showcasing products that you know they want to buy.
- Encourage people to review the business and the products as it is a great way to build new relationships.
- Take proper measures to allow the customers to make their purchases within their social media experience.
- People are more aware of their rights as consumers and they are very much conscious about the quality of the products. So, to ensure the increased participation of the customers on the social commerce platforms, quality of the products should be taken into consideration.
- Attractive and creative advertisements and posts on these platforms have an influence on the purchase decision of customers. Making it attractive will lead to more engagement of customers and increased sales.
- Providing good service quality will bring more customers to these platforms.
- Capturing the trust of the customers will help to retain the existing customers and attract the new customers.
- Interactions by way of messages, collaborations etc. can make a good relationship with the customers.
- There should be transparency and non-discrimination in publishing the ratings and reviews as many of the customers look for online reviews before they make the purchases.

## **SCOPE FOR FURTHER RESEARCH**

Even though numerous studies have been conducted on social media and ecommerce but there are hardly any studies conducted regarding social commerce. The research findings are expected to highlight and contribute significantly the factors influencing the adoption of social commerce by customers. It also directs the companies on increasing and improving the awareness, satisfaction and purchasing decision of consumers on social commerce platforms and it also helps the customers to know more about social commerce. As social commerce is still in its infancy, the analysis, findings and suggestions to be proposed by the researcher will be helpful for further studies in social commerce. Further, the research provides the scholars with an initial set of understanding and setting for the construction of materials that can be undertaken for subsequent studies.

## **CONCLUSION**

The study on customer engagement on social commerce platforms reveals the various factors influencing the customer's adoption of social commerce platforms. The results of the study shows that the factors such as trust, recommendation, ratings and reviews are having a significant positive influence on the customer's intention to adopt social commerce.

Moreover, it also shows that there is no association between gender and the customer engagement on the social commerce platforms. Instagram, Youtube, WhatsApp, Facebook etc. are the famous platforms for the brands, through which they can interact more with the customers and increase their sales potential. This is because the followers of these social media influencers actually make their purchases of their products after their recommendations. By creating trust and good relationship with the customers social commerce can attract and reach more customers as the majority of people are spending their time on these social media platforms.

On the basis of the findings of the study it is evident that the social commerce will soon gain popularity among the users even though it is in the infancy and it will be the next generation trend that will definitely reshape the future of commerce.

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## **DOES GDP OR INFLATION INFLUENCE SEVERELY ON INDIAN STOCK MARKET – A CRITICAL ANALYSIS**

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### **ABSTRACT**

The level of inflation governs the country's buying power since mounting inflation will result in elevated pricing for a variety of products and services. An economy of a nation will be gravely impacted by rising inflation since the consumers would procure much fewer things at higher costs, which will trim down the business income and GDP and sluggish the economy. The societal, political, and economic factors all have an impact on how the capital market reacts. It is essential to the growth of commerce and industry, which in turn has a significant effect on a country's economy. Regardless of the fact that bounteous research specialists throughout the world have carried out countless surveys, the majority of the studies have a western-centric orientation. This study uses secondary source data to examine the link between the variation in GDP and inflation and how it affects stock indices of FMCG and Pharmaceuticals. Data analysis is done using Kendall's tau-b correlation using SPSS. According to the findings of the study, there is no significant association between the rate of variation in GDP and inflation as well as with the sectoral stock indices in the Indian stock market selected for the study.

**Keywords: GDP, Inflation, Sectoral Stock Indices**

## **INTRODUCTION**

Many economists from the public, private, and academic sectors have studied the relationship between inflation and various macroeconomic variables like the GDP, broad money supply, per capita income and stock market index. In the long term, monetization eventually upshots in an expansion of the money supply, which ultimately drives up inflation. The rising focus on inflation in many nations, predominantly India, has harmed world history. India is an economy that has lived with inflation throughout its history.

Nations drudge to raise their GDP in an exertion to raise their living standards. A nation's economic development is evaluated in terms of an increase in the size of its economy, which can be by and large measured in terms of its GDP, which is the total value of finished goods and services produced within a country's borders in a year, regardless of ownership. Two sources of data to recognise inflation are the Consumer price index and the Wholesale pricing index. No increase in purchasing power will occur if inflation is among the factors driving GDP growth. The country's domestic production of goods and services is gauged by the GDP.

Inflation distorts the GDP number without any modifications. Inflation is the slow but sure-fire augmentation in the cost of commodities and services. The purchasing power of money and the worth of the financial asset both deteriorate when there is an upsurge in price. From a different angle, an upsurge in the inflation rate causes the stock valuation model's discount rate to increase, which lowers share values, encourages monetary and fiscal measures that would constrain aggregate demand by letting down the money supply and raises interest rates. Growth rate, company performance, and stock returns would altogether suffer as a result. The cost-of-living index rises in tandem with inflation, plummeting buying power. High inflation rates are a sign of poor real money value, decreased consumer purchasing power, declining profitability, and inferior real investment returns. The link between the variation in GDP and inflation and how it affects stock indices across two different industries like FMCG and Pharmaceuticals is investigated in this research.

## **REVIEW OF LITERATURE**

Markets are effective, according to Fama (1970), when stock prices represent all available information. Inverse relationships between stock returns and inflationary expectations were



discovered by Fama and William Schwert (1977). Rising inflation raises consumer spending as more money is indispensable to procure the same amount of goods and services, which pulls down savings and investment by diverting rationed resources intended for investment to consumption resulting in less demand for stocks, lowering share prices. Furthermore, a rise in inflation has a negative impact on company profitability due to higher input prices, higher debt payments, and market pressure, resulting in a weakening in stock values because of inferior and adverse corporate performance (Fama, 1981). Research by Pearce and Roley (1985); Hardouvelis (1988), revealed no correlation between inflation and the stock market. Stock returns were a perfect hedge for the predicted component of inflation for India (Chatrath et al. 1997), but they revealed a negative connection for the unexpected component of inflation. Schotman and Schweitzer (2000) found out the relationship between stock returns and inflation across large time horizons, using Fisher's hypothesis. Inflation boosts GDP in four South Asian countries over the long term (Mallik and Chowdhury, 2001). Some news are firm-specific or affect a certain industry, but others, such as inflation and GDP growth influence the market as a whole. Inflation is just one of the macroeconomic factors that may have an impact on the stock market (Corrado and Jordan, 2002). The prosperity of the stock market is not directly correlated with the state of the economy (Srinivasan, 2011). Stock prices related to various macroeconomic factors like deposit interest rates, CPI, exchange rates, crude oil prices, and broad money supply and came to the conclusion that inflation has little to no effect on stock prices (Khan and Yousuf, 2013). Inflation has a significant negative influence on GDP (Pratiwi, 2015, Ratnasari, 2016).

## **RESEARCH GAP**

Copious educational research has exhibited that the rate of inflation notably affects the GDP advance and in turn the stock market indices of the shares traded on stock exchanges throughout the world. This study looks at how effectively the inflation rate affects the GDP growth rate in projecting future stock prices in the context of the Indian stock market. As a multitude of research is conducted in western contexts, with few types of research in the Indian context, the academicians should focus on how the rate of inflation affects the GDP growth as well as the deviations of different sectoral stock values in the Indian scenario, which would help the future investors, decision-makers, and businesses.

## SCOPE AND OBJECTIVES OF THE STUDY

1. To determine whether inflation directly affects GDP
2. To find out whether both GDP and Inflation influence stock indices of selected sectors like FMCG and Pharmaceuticals

There should be further studies in the future, to examine the inflation rate, GDP rate, other macroeconomic factors, sectoral stocks, their inter-relationship, and the outcomes of stock price decisions will be very constructive to investors, policymakers, and companies.

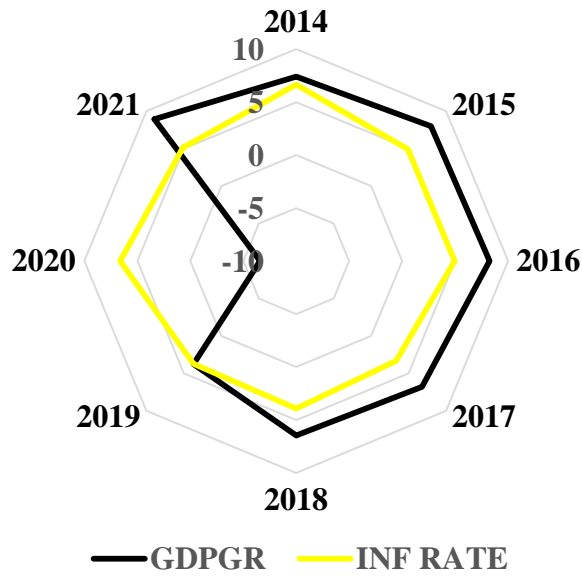
## HYPOTHESIS TESTING AND ANALYSIS

The research made use of data from various sources from 2014 to 2021, including inflation rate, GDP growth rates and stock indexes for pharmaceuticals and FMCG. Conflicting with the null hypothesis (H<sub>0</sub>), which stated that there is no significant relationship among the rate of increase in inflation, GDP and sectoral stocks in the Indian stock market, the alternative hypothesis (H<sub>1</sub>) asserted that there is a relation among the rate of increase in inflation, GDP and sectoral stocks in the Indian stock market. The results were examined using Kendall's tau-b correlation using SPSS.

Variables	P values
Inflation rate and GDP	0.214
Inflation rate and FMCG	0.357
Inflation rate and Pharmaceuticals	0.286
GDP and Pharmaceuticals	0.071
GDP and FMCG	0.286

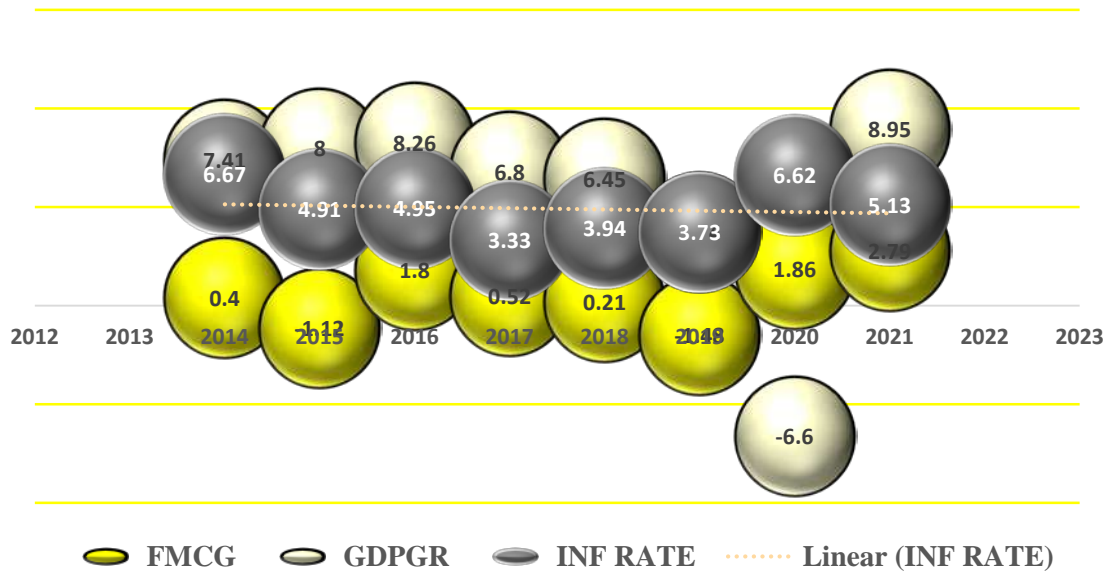
The null hypothesis, which argues that the rate of rise in inflation and GDP does not considerably affect the sectoral shares that are traded on the Indian stock market, given that each of the p-values is more than 0.05 has to be accepted. Thus, it can be concluded that there is no profound correlation among the rate of inflation, GDP growth, and sectoral equities in the Indian stock market.

**Chart-1 Comparison of GDP Growth Rate and Inflation Rate**



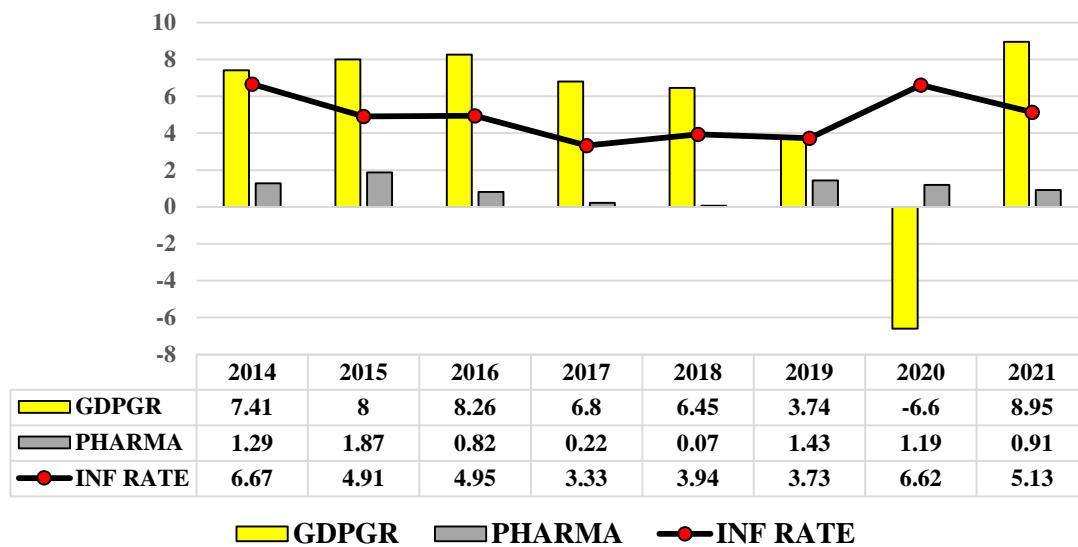
The Chart-1 given above shows the relationship of GDP growth rate and inflation rate.

**Chart-2 Comparison of GDP Growth Rate, Inflation Rate and FMCG**



The relationship among inflation rate, GDP growth rate and the stock index of FMCG is depicted in the above Chart-2.

**Chart-3 Comparison of GDP Growth Rate, Inflation Rate and Pharmaceuticals**



The relationship among inflation rate, GDP growth rate and the stock index of Pharmaceuticals is explained above (Chart-3).

## CONCLUSIONS AND RECOMMENDATIONS

The investigation indicates that there are a number of added factors at play in addition to the rising inflation as well as GDP rate that contributes to changes in stock market indexes. The degree of connexion among inflation, GDP growth and stock market indices found in the most recent studies, however, cannot be wrangled. Future research should therefore examine additional variables, such as monetary and fiscal policy, peer effects, financial news from the web, macroeconomic indicators like GNI, NNI, CPI, WPI, BOT, BOP, money supply, oil prices, FDI, FFI, repo rates, reverse repo rates, industrial production index, unemployment exchange rates, per capita income, gold rates, interest rates and residual income etc., in order to determine how everything influences stock prices in the security market, which will be a fantastic feature pool to add to the treasure trove.

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## **AN APPROACH FOR CREDIT CARD FRAUD DETECTION USING MACHINE LEARNING**

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### ***ABSTRACT***

Today Credit card fraud problem is a widespread issue. Digital world made people to rely on credit cards and debit cards and it turns a threat to common people. Machine learning is a new approach to find a solution for this problem. It is capable of automatically spotting fraud indicators. By using a person's historical data, the user's pattern and behavior can be analyzed and can determine whether the transaction is fraudulent or not. Many approaches are there for detecting the credit card misuse. Various machine learning algorithms like Random Forest Algorithm, K-Nearest Neighbored and K-Means Clustering etc. can be used for this purpose. In this paper, various approaches are evaluated and compared in quest of the optimum solution for credit card fraud detection. It is found that random forest algorithm is the best method for detecting credit card fraud or misuse in the current scenario. One of the bottleneck of this algorithm is that the processing speed of this algorithm is found to be very low. As a solution to this problem, Fast forest algorithm is proposed to detect credit card fraud. Its processing speed is

comparatively faster than random forest algorithm.

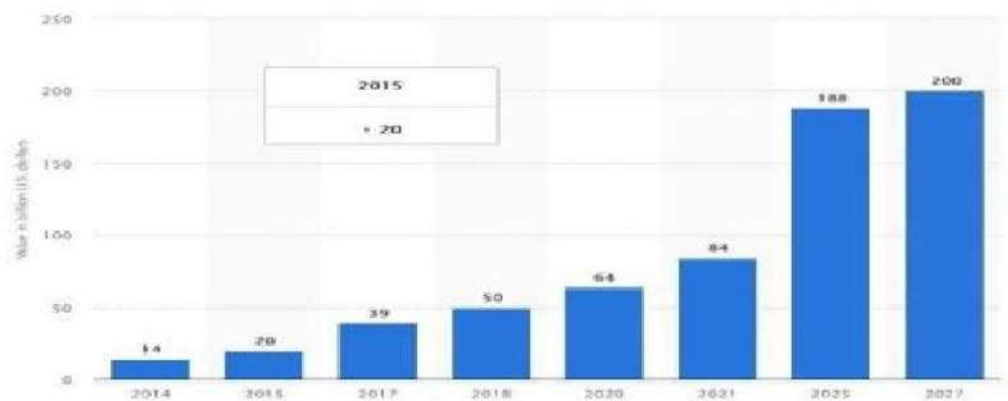
***Index Terms*—Machine Learning, Credit Card, Fraud Detection, Fast Forest**

## INTRODUCTION

The people in the twenty first century live in a digitalized world that comprises with the knowledge of computer for the ease of living. The money transactions became digitalized and there came the use of credit cards. Credit card is an electronic payment system that are used for the non-cash transactions. The bank or financial institution issue credit card to a consumer to facilitate payment to merchant of goods and services. Credit score card typically refers to a card assigned to the purchaser (cardholder), commonly permitting them to purchase items and services inside credit restrict or withdraw coins in advance. Credit card provides the cardholder the gain of time.

A credit card is considered fraudulent when an unauthorized person misuses your credit card without your knowledge. Fraudulent steal the credit card PIN code or account details to perform one of the unauthorized transactions without robbery of the original physical card. Using credit card fraud detection, we could find out if new transactions are fraudulent or bonfire.

Nearly 1.4 million cases of identity theft were reported in 2020. Married women are the most common victims of identity



**Fig. 1. Growth of E-Commerce sites**



Theft. The FTC estimated that 9 million identities are stolen each year.

The fraud involved in this crime include a credit score card or debit card. In this, the cardboard itself acts as a fraudulent source within the transaction. The reason of committing the crime may be to achieve the goods without paying cash or to gain the unauthorized fund. The motive behind is to earn money without taking much risks in a short span of time. The graphical representation shows in Figure 1.

As internet usage is increasing these days, there may be many possibilities for the fraudsters to commit credit card frauds'-commerce websites becomes their principle target for this criminal activity. In the current scenario, people depends more on online facilities for financial transactions. The use of the e-trade websites is growing day by day, thereby causes increased credit card misuses.

## **LITERATURE SURVEY**

Lakshmi and Selvani said in the paper titled" Machine learning for credit card fraud detection system" [6] machine learning technique like logistic regression, Decision tree and Random forest were used to detect the fraud in credit card system. The accuracy for logistic regression, Decision tree and random forest classifier are 90.0, 94.3, and 95.5 respectively. By comparing all the three methods, it is found that random forest classifier is better than the logistic regression and decision tree. In the paper titled" Credit card fraud detection using machine learning algorithms", [2] the writers Dornadula, vanish navy Nath, and Sa Geetha developed a novel method for fraud detection, where customers are grouped based on their transactions and extract behavioral patterns to develop every card holder profiles. Then different classifiers are applied on three different groups. Later rating scores are generated for every types of classifier. The dynamic changes in parameters lead the system to adapt to new cardholder's transaction behaviors, followed by a feedback mechanism to solve the problem of concept drift. It is observed that the Matthews Correlation Coefficient(MCC) was the better parameter to deal with imbalance dataset. By applying SMOTE, they tried balancing the dataset and found that the classifiers were performing better than before. The other way of handling imbalance dataset is to use one-class classifiers like one-class SVM.

## METHODS FOR DETECTING CREDIT CARD FRAUD

Many different techniques are used to locate such credit card fraud detection. Machine learning techniques can also be incorporated to detect credit card fraud detection.

### A. Random Forest Algorithm

Random forest algorithm is one of the broadly used supervised learning algorithms. This is especially used for solving classification problems. The Random forest algorithm creates the selection trees on the patterns and receives the prediction from the pattern. Literature review shows that Random forest algorithm gives better results than decision tree algorithm in terms of performance. The pictorial representation is shown in Figure 2.

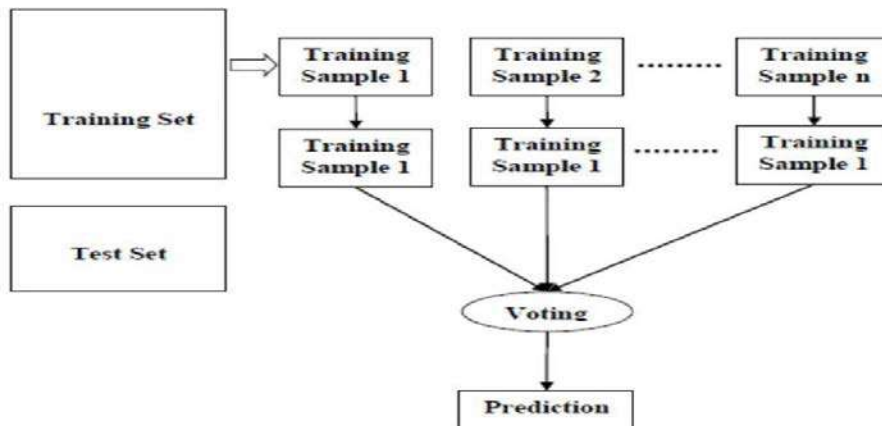


Fig. 2. Random Forest Algorithm

### Steps of Random Forest Algorithm

- Kaggle credit card extortion dataset is prepared and a portion of the sample information is selected.
- Decision trees are made from the samples and prediction result is obtained from every decision tree.
- Voting will be performed for the predicted result
- Finally, the most voted prediction result is selected as the final prediction result.

1) *Advantages:*

- Both regression and classification tasks can be performed by this method.
- Random Forest predictions can be understood easily.
- Large datasets can be efficiently handled.
- When compared to decision tree algorithm, random forest algorithm provides a higher level of accuracy in predicting the outcomes.

2) *Disadvantages:*

- In case of real time predictions, large number of trees makes the random forest algorithm too slow and ineffective.
- Generally, most of the algorithms are fast to train, but once they are trained, it is quite slow to create predictions

B. *K-Nearest Neighbor*

One of the simplest machine learning techniques based on supervised learning is K-Nearest Neighbor. The K-NN algorithm makes the assumption that the new case and the existing cases are comparable, and it places the new case in the category that is most like the available categories. K-NN algorithm stores all the available data and classifies a new data point based on the similarity. This means that utilizing the K-NN method, new data can be quickly and accurately sorted into a suitable category. The K-NN approach can be used for both classification and regression problems, but it is more frequently utilized for classification problems. As a non- parametric algorithm, K-NN makes no assumptions about the underlying data. The K-NN algorithm is also known as lazy learner algorithm because it does not learn from the training set immediately instead it stores the data set and performs the action on the data set at the time of classification.

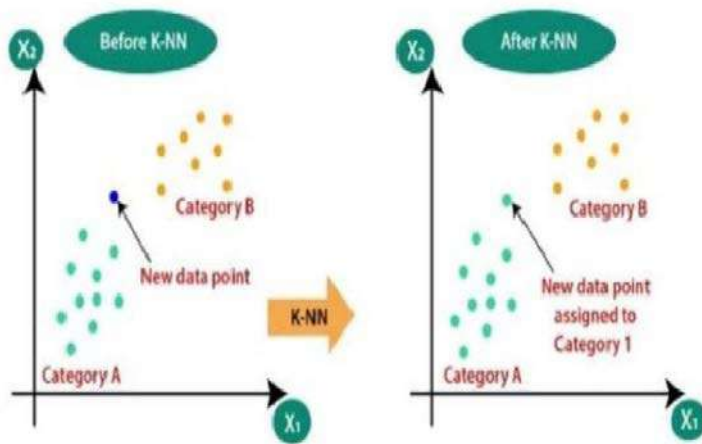


Fig. 3. General structure working of the KNN [1]

1) *Advantages:*

- Multi-class cases can be handled naturally
- Both classification and regression problems can be solved.
- KNN Algorithm is extremely simple to implement.

2) *Disadvantages:*

- When the amount of data is large, the prediction stage may run slow.
- More memory is required to store the training data.
- It is computationally expensive since it stores all the training data.

*C. K-Means Clustering*

K-means clustering is a machine learning algorithm that is used to solve the clustering problems. K-means clustering group the unlabeled dataset into different clusters. Here' K' denotes the number of clusters that need to be created in the process: i.e. for two clusters, the value of k=2,for three clusters the value of k=3 and so on. The assignment of data points to a cluster is made in such a manner that the sum of the squared distance between the data points and centroid would be minimum. An Expectation-Maximization is used by K means to

solve the problem. Assigning the data points to the nearby cluster is done by using the Expectation step and computation of the centroid of each cluster is done by the Maximization step.

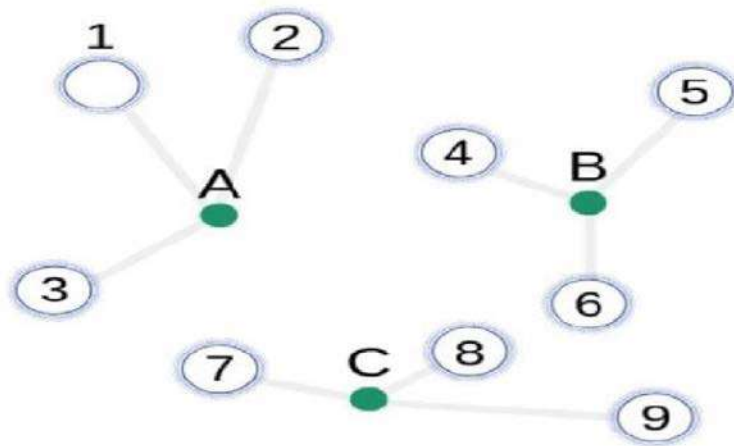


Fig. 4. General structure and working of K-MC

1) *Advantages:*

- It can be used for large datasets.
- Effective as it is extremely simple to implement.
- Tighter clusters are formed.
- 

2) *Disadvantages:*

- Difficult to predict the number of clusters.
- Sensitive to re-scaling.
- Order of data will affect the final output.

## COMPARISON USING PARAMETERS

This paper lists the advantages and disadvantages of each algorithm and finds the most effective one to detect fraudulent transaction. Three parameters are used for comparative study: they are Detection Ratio, Accuracy, and Efficiency. Through these comparisons we assume all these three algorithms detection ratio and efficiency in large dataset is faster and good but its accuracy is different. That is Random Forest Algorithm and K-Means Clustering Algorithm has higher accuracy but the accuracy of K-Neighbor Algorithm has lower accuracy than the other two algorithms. Credit card fraud is become a threat to the people in this digitalized world. For detecting credit card fraud, we, Machine Learning Algorithm is used. Random Forest and K-Nearest Neighbor and K-Means Cluster are different approaches that are used for this. These algorithms help the credit card companies to identify the fraudulent transactions more accurately within a short time and low cost. All this technique has its own advantages and disadvantages. Based on the company need one can choose any one of these approach. This kind of comparative study will allow the people to build a hybrid approach most accurate for fraudulent credit card transaction detection.

This paper focuses on Random Forest Algorithm which is a supervised learning technique. It is usable in both classification and regression problem and is based on the concept of ensemble learning, which is the process of combining multiple classifier to solve a complex problem and to improve the performance of the model. As the name suggests, Random Forest is a classifier that contains a number of decision trees on various subsets of the given dataset and takes the average to improve the predictive accuracy of that dataset. Instead of relying on one decision tree, the random forest takes the prediction from each tree and based on the majority votes of predictions, and it predicts the final output. The greater number of trees in the forest leads to higher accuracy and prevents the problem of overfitting. But speed during testing and application will suffer. Table I shows the comparative study of random forest algorithm-nearest neighbor and k-means clustering algorithm in terms of efficiency, detection ratio and accuracy.

	EFFICIENCY	DETECTION RATIO	ACCURACY
RF	faster	higher	good
KNN	faster	low	good
K-Means	faster	higher	good

TABLE I

### COMPARISON OF EXISTING TECHNIQUES

## PROPOSED METHOD

The limitation of random forest algorithm can be eliminated using Fast Forest Algorithm. Through this algorithm we can improve the testing speed of the application. Fastforest algorithm delivers an average of 24 percentage increase in processing speed compared with Random Forest. FastForest achieves this result: Subsample Aggregating ('Sub bagging'), Logarithmic Split-Point Sampling and Dynamic Restricted Subspacing. Steps of FastForest Algorithm are as follows: First begin with an overview of the algorithm. Before introducing the components used, start with sub bagging followed by LSP, DRS and conclude with the algorithm for the proposed components.

## CONCLUSION

This study compares three machine learning algorithms used for detect credit card fraud. The algorithms are compared for three parameters: detection ratio, accuracy and efficiency. The Random Forest Algorithm is a supervised machine learning algorithm used in both classification and regression problem. It contains a number of decision trees on various subsets of the given datasets and takes the average to improve the predictive accuracy of that dataset.

The problem with this algorithm is that it takes more time for the application to run. This problem can be addressed by Fast Forest Algorithm. It is faster than Random Forest Algorithm.

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## **CLIMATE FINANCE: THE NEED OF THE HOUR**

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### **ABSTRACT**

Climate change is affecting every country on every continent. It is disrupting national economies and affecting lives. Climate change refers to long-term shifts in temperatures and weather patterns. Climate change may be natural or due to changes in solar cycle. Burning of fossil fuels like coal, oil gas also results in climate change. Climate change causes scarcity of food and water resulting in increased heat, floods, more disease and economic loss. It affects our ecosystems, environment and also human beings. Countries should try to reduce greenhouse gases and omissions to survive to climate change.. Every country should direct their financial resources, sound investments to address their countries climate change.As every countries are trying to recover from Co-Vid pandemic, emissions will rise increase to higher levels. Climate finance is the need of the hour to be addressed by all countries. Financial resources will help to reduce the adverse effects and reduce the impacts of a changing climate. This paper tries to find out the need of Climate finance in budget allocation. Climate finance is important as the set aside financial resources are needed to adapt the adverse effects and reduce the impacts of a changing climate.

## INTRODUCTION

Climate change is affecting every country on every continent. It is disrupting national economies and affecting lives. The significant impact of climate change is that weather pattern changes, sea levels will rise, and extreme weather conditions which could not be predicted. The greenhouse gas emissions from human activities are driving climate change and continue to rise. They are now at their highest levels in this century. If no action is taken by every countries to address climate change, the average surface temperature is projected to rise over 21st century and will supress 3 degree Celsius this century with some areas of the world expected to warm even more. The poorest and most vulnerable people are being affected the most. To address both pandemic and climate change to save lives and livelihoods, urgent actions to be taken immediately.

The Paris Agreement, 2015 aimed to deal with the impacts of climate change with adopting a frame work, making policies, ensuring Climate finance being set aside to reduce the effect of climate change. Green houses gases known as fossil fuels is increasing in the atmosphere due to burning of coal, oil, natural gas resulting in the increase of carbon dioxide in the atmosphere. The more carbon dioxide, heat is trapped and earth becomes hotter. This process is known as “global Warming “

As per NOAA’s temperature data Earth’s temperature has risen by 0.14° Fahrenheit (0.08° Celsius) per decade since 1880, but the rate of warming since 1981 is more than twice that: 0.32° F (0.18° C) per decade.

The Global surface temperature in June–August 2022 was 0.89°C (1.60°F) above the 20th-century average of 15.6°C (60.1°F). Compared to June – August 2015 to 2017 month periods, this ranks as the fifth-warmest June-August period in the 143-year record. World bank predicts by 2050 as many 40 million people could be displaced.

COVID – 19, economy recovery is to have clean, green, healthy, safe and more resilient country. Shifting the economy to more sustainable economy where people and planet is protected. UN Secretary has proposed six climate positive actions for governments such as Green Transition, Green jobs, Green Economy, invest in sustainable solutions, Confront all climate risks, Cooperation. Governments have to spent time and effort to develop plans to chart a safer and more sustainable future for citizens.

Climate finance is important for adapting adverse effects and to reduce the impacts of a changing climate. The Convention, the Kyoto Protocol and the Paris Agreement seeks for more financial assistance from Parties with more financial resources to those that are less endowed and more vulnerable. The agreements seeks the contribution of countries to climate change and to prevent it and cope with its consequences. Climate finance is needed for mitigation the effects and as such demands large-scale investments to significantly reduce emissions.

Climate finance refers to local, national or transnational financing from public, private source to mitigate and adapt actions that will address climate change. The need for climate finance recognizes that the contribution of countries to climate change and their ability to prevent it and cope with its consequences vary enormously. Large scale investment is needed to mitigate the ill effects of climate change Climate finance is important for adaptation, as significant financial resources are needed to adapt to the adverse effects and reduce the impacts of a changing climate.

United Nations Framework on climate defines Climate finance as "finance that aims at reducing emissions, and enhancing sinks of greenhouse gases and aims at reducing vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts". Climate finance is about making investments to enable activities that reduce greenhouse gas emissions or support adaptation to climate change. This can include investments in clean energy, land use, disaster risk management, and resilient infrastructure.

The action plan of climate change requires significant amount of financial investments, particularly in new energy systems , infrastructure which could withstand climate change impacts to a greater extent. But climate action is more expensive. Eleven countries need to reduce their carbon emissions to adapt to climate change. But many developing countries lack the resources and the technology to do so. That's is the reason why all countries have agreed that industrialized nations with money and technological know-how must come up and try to increase their financial support for climate action in developing countries, particularly in the poorest and most vulnerable countries . International cooperation is essential for tackling climate change.

The Paris Agreement stresses the need for the developed countries, to make voluntary contributions to Developing Countries Parties to take the lead in mobilizing climate finance from a wide variety of sources, instruments and channels, noting the significant role of public funds, through a variety of actions, including support driven strategies, and taking into account the needs and priorities of developing country Parties. The aim of Paris Agreement was to make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development and also placed emphasis on the transparency and enhanced predictability of financial support. The parties adopting the Paris Agreement Parties confirmed for a concrete road map to achieve the goal by 2020, and agreed that prior to 2025 the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement shall set a new collective quantified goal from a floor of USD 100 billion per year.

## **OBJECTIVE**

To understand the importance of Climate Finance in the context of climate change.

## **REVIEW OF LITERATURE**

**Koyel Kumar Mandal**, Climate Finance. In: India in a Warming World. , (2019) conducted the study on climate change- climate finance in India, reviewed India's current efforts at mobilizing finance for mitigation and adaptation from various sources, and analyses the major drivers behind the flow of such funds. The focus of the paper was on the Indian climate finance landscape, debates of climate finance at the international level, and the challenges they faced in determining India's requirements for climate finance. Study also discussed institutional arrangements of climate finance and their implications and concluded by summarizing the key insights for India specific model of pooling and Mobilising funds for climate finance.

**Varun Agarwal, et al.**, “**Modelling Decarbonisation Pathways for the Indian Economy**, (2021) briefed four scenarios of climate action for India. First a systems dynamics model called the Energy Policy Simulator for India. The paper also investigated policy trade-offs and co-benefits and the estimates the costs of climate action. It would result in Indian Economy willboost jobs and GDP. The low-carbon transition will require massive investments in power, industry, transport, and hydrogen. Technology costs could be reduced if early adoption of technology could be done.

Stefano Giglio, Bryan Kelly, and Johannes Stroebe, (2021) studied the interactions between climate change and financial markets. Various approaches incorporating climate risk in microfinance models was studied. The study also looked into the price of climate risks for a large number of asset classes, including real estate, equities, and fixed income securities. The study discussed how investors used these assets to construct portfolios that hedge against climate risk. And also proposed several different dimensions for future research in climate finance.

## Sources of Funding

- **Multilateral climate finance** – these resources support projects and interventions through many channels, including Multilateral Development Banks, GCF, CIFs, and other dedicated funds. These banks develop Special Purpose vehicle for supporting climate finance. As of now their contribution to climate finance is small and they could scale up to provide more funds.
- **Users through user fees** – Fees could be charged on money spent on energy expenditure or ratepayer-backed “securitized” bonds. Electricity customers could be asked to pay tariffs using coal plant investors but contribute to emission reduction.
- **Taxpayers** – Taxpayers will be asked to pay taxes on this special component which could be used as a source of funding.
- **Philanthropies** – Philanthropies can provide finance in the form of support in technical assistance, in project preparation and in providing blended finance. As of now their allocation to climate finance fund is relatively small which could be increased to larger amount.
- **ESG capital markets** – Institution investors have started making investments in those projects which support climate commitments. These kind of investments are growing today and new innovative financial products in private sectors are also coming up. For example, the Rhino Bond facilitated by the World Bank.
- **Carbon markets, including regulatory and voluntary markets** –The platform could finance high impact GHG emissions-reducing investments with high carbon

offset generation potential in emerging markets, including coal decommissioning, nature-based solutions, new and emerging technologies, and energy efficiency.

## **Climate Finance in India**

The rising incidences of natural calamities 2021 was a critical year for global diplomacy in decades. COP26 was a chance for political leaders to acknowledge the climate emergency more purposefully to come up with more climate goals .The key decision of Glasgow climate Pact, climate finance was the key focus asked by developing countries from developed countries. Capacity and resources are needed to fight climate change as world demands. Developed countries can contribute knowledge transfer and technology which will provide opportunities for countries to finance. India also announced a set of more ambitious emission reduction targets and has joined the global world by announcing a net zero goal by 2070, in the present context of climate action.

At national level climate goals are set, regulations are made which are guided by the centre, Policy implementation and schemes will happen at state level .So to achieve the goal both government should play an important role.. Recent analysis shows that India needs \$1.4 trillion of additional foreign support till 2070 to achieve the net zero emissions target- A report by the Council on Energy, Environment and Water's (CEEW) Centre. India is taking bold actions through greater climate leadership. India's renewed its goals and the amount of finance needs, but also look into in the local perspective also.

At the COP26 summit in Glasgow India agreed to pursue a goal of net zero emissions. India is gearing to act together on climate change. In country like India , private investment is also needed to meet India's climate goals .

## **Climate Finance commitments from Corporate India in 2021**

- Reliance made India's biggest net-zero commitment, pledging USD 80 billion to green energy projects. Their acquisition-led strategy will lead to a rise in near-term investments.
- 8 out of the 10 big companies in India (by market capitalisation) set net-zero goals, with most targeting net zero emissions by 2030.

- Net-zero commitments of global giants like Amazon, LG, Hyundai are pushing their value chains in India (including MSMEs) towards greener options.
- ESG Funds in India now have USD 1.7 billion in assets under management, up ~40% from 2020.
- 67 Indian companies committed to taking climate action

Private action will have to play a significant part India's climate action which will be driven by net zero commitments of private corporations and funders, both in India and globally. Government will still be a crucial player, along with non-government drivers that will impact climate action in the next 10 years. Further reduction from private net-zero action 2030 target

- Companies setting net-zero targets of their own
- The position of companies as part of global supply chains of companies that are committing to net-zero across their value chain
- The influence, opportunities, and expectations of investors and asset financiers looking for net-zero transitions across their assets.

### **India needs USD 1.01 Trillion in Climate Finance by 2030 India's 2030**

India's climate action investments from 2022 to 2030 will total USD 1.01 trillion, an average of USD 112 billion annually. This investment gap is consistent with the emissions target India has set for 2030.

The investment estimate is an increase from our 2021 estimate of USD 910 billion from 2021 to 2030, mainly due to the increased focus in energy sectors beyond renewable energy supply, which is estimated as USD 300 billion until 2030, but now gauge at USD 540 billion.

Sustainable food investment is reduced from our 2021, that related investments will take longer to see larger ticket sizes. Resilient cities estimate urban infrastructure development targets announced by the Government of India.

- The main focus of these investments
- Renewable energy: Adding 400 GW of renewable energy capacity



- Generation Efficiency: Grid modernisation and smart metering
- Demand Efficiency: Decarbonising industries, alternative heating and cooling technologies
- Electric Transportation: Electric vehicle production and charging infrastructure
- Sustainable Food: Farm productivity, food supply chains, plant based alternatives, methane emission reduction in farming and dairy
- Resilient Cities: Waste management, water, sanitation, disaster management

## **Ideas and Trends for 2022**

A few innovative ways include

- Solid waste processing Policies, including Extended Producer Responsibility (EPR) norms and recycling targets, will drive private finance into innovations linked to resource recovery.
- Energy efficiency through installing efficient equipment's in homes, buildings and industries, energy audits, and efficiency solutions.
- EVs-Electric vehicles are a small but rapidly growing market EV today is where solar was a decade ago. In ten years, EVs will likely achieve price parity with conventional vehicles, with market shares expected to be 20-30%.
- Agritechs will need to make real change happen on ground
- Supply chain transitions
- Climate equity funding to diversify
- Green bond markets should grow and diversify
- Climate fintechs to bridge the innovation funding gap

## CONCLUSION

Climate finance is a new avenue for climate tech start-ups to access markets and access equity and non-dilutive capital. Climate works to support the development and adoption of innovative structures to mainstream climate innovations, by employing targeted approaches focused on two core areas for start-up success: financing and funding, and market growth.

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**A STUDY ON UPSURGE IN THE ADOPTION OF OTT PLATFORMS  
DURING COVID-19 PANDEMIC WITH SPECIAL REFERENCE TO  
THRISSUR DISTRICT**

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**ABSTRACT**

As decades passed by, emergent internet penetration with its accessibility and the availability of multiple screens and gadgets have stimulated the imaginative canvas for thematic exploration with the development and growth of OTT platforms. It is also seen that uptake for OTT has gone up considerably owing to COVID-19 pandemic bringing in an increase in viewership of OTT platforms, as people were under a lockdown. The satisfaction level of customers have also risen due to quality family time, convince to use OTT platforms, the quality of content on OTT platforms and preference of OTT platform over television. This change in consumer behaviour is interesting to observe and evaluate as there are numerous strata in this consumption pattern which need to be understood from various angles. This study has been an edge to analyse the perception of the consumers of Thrissur district, towards this latest streaming method and its future possibilities.

**Keywords:** *COVID-19 pandemic, OTT platforms and consumption pattern*

## **INTRODUCTION**

OTT stands for “Over The Top” and refers to any streaming service that conveys content over the internet. The service is delivered “over the top” of another platform. In the modern era, users can sign up for services like Netflix or Spotify and access their offerings over the internet. The cable provider now only provides the internet connection and has no aptitude to control what you consume. Lots of companies are entering the OTT space, providing a wide variety of selections for consumers, thus increasing quantities of ad portfolio for marketers. The type of OTT service most users probably interact with most regularly is video OTT. Services like Hulu, or Disney + Hotstar, Netflix, are video OTT services, which provide users with a number of programming routes. Another major OTT market is audio, with services such as Spotify now almost one and the same with music streaming. Users have right to use a massive library of recording artists and podcasts via an internet connection. Most users now use OTT messaging services like WhatsApp, Telegram or Signal, which allow them to use their internet connection to share information. Many OTT services operate on a paid subscription basis, but a large number also run advertisements or offer tiered suites that allow users to either pay for ad-free experiences. Since the over-the-top platform has now enabled customers to straightforwardly access content anywhere, anytime in a single go, making progressively people switch over to OTTs. During the pandemic period OTT streaming platforms, new net viewership carry on to be much higher than pre pandemic months.

## **STATEMENT OF THE PROBLEM**

Digitalization has smoothed way for many avenues for streaming services to connect and engage customers. This new genre of telecasting is known as OTT Platform services. With the use of mobile and internet connections, the OTT media providers telecast shows, movies and other programs through applications and websites which can be easily accessed by the people. The COVID-19 pandemic occurrence gave an impetus to the adoption of OTT in India. Moreover the competition between existing players is leading to revamp of regulations, marketing formats and advertising on the platform are influencing. Hence this study aims to realize the perception of the consumers of Thrissur District, towards this latest streaming method of entertainment and define the factors influencing the motivational aspects of users to opt for OTT Platforms.

## **OBJECTIVES OF THE STUDY**

- To study and analyze the audience preference and subscription behavior towards OTT platforms during the pandemic.
- To determine the demographic factors influencing the motivational aspects of users to opt for OTT Platforms.
- To analyze the consumption habits of audience towards OTT platforms during the pandemic period.

## **SIGNIFICANCE OF THE STUDY**

COVID-19 is global pandemic which has changed the onlookers on the mode of being entertained and engaged. There is an ever more growing number of consumers adapting to OTT Platform. While global players like Netflix and Amazon prime have steadily matured with their market share in India, Indian streaming services like Hotstar and JIO Cinema has enlarged a stronger foothold. This paper explores the role played by the pandemic situation in evolving OTT media consumption trends. It is an comprehensive insight about OTT platform adoption and future prospects of streaming service in India.

## **REVIEW OF LITERATURE**

**Gangwaret al.,** 2020 studied the preference of OTT platforms in India. Technological Advancement and content quality is the major preference that powers the Indian customers to adopt the OTT platform. The study concluded that the millennium is attracted towards the OTT platforms owing to foreign content and video on demand facilities.

**Article (Singh, 2020)** OTT platforms has experienced a surge in intake and subscribers engagement, impacted by the COVID-19. The latest survey by In Mobi states that 46% onlookers are watching more content online. According to the experts OTT Services could grow further in upcoming days as the television channels run out of content. “As these channels have been powerless to shoot due to lockdown, they are running old content. In such a scenario people will drift down towards OTT to watch Fresh content,” says Paritosh Joshi, media consultant and principal, Provocateur Advisor. To benefit from this increase in demand platform such as Amazon Prime Video and Zee5 have made few of their shows free to watch.

Due to this, Zee5 has witnessed an 80% increase in subscription and over 50% time spend recently. Thrillers, urban drama and young romance are the top performing genres on the Platform. The viewership for the movies has appreciated significant increase across the Platforms. Cinema streaming services MIBI has seen 28% rise in viewership on its Platform in March, compared to February.

**ICFAI** (2019) report on “Transition of Consumer towards Video Streaming Industry: A comparative analysis of Netflix and Amazon Prime.” mentioned that the content is said to be the king when it comes to on-demand video streaming channels and Netflix has slight edge over others in terms of content. Hotstar seems to be considerable select since the content is offered at affordable prices.

In the study “Understanding Adoption Factors of Over-the-top Video services among millennial consumers”, researchers highlighted the four major factors that affect consumer adaptation towards unlike platforms. They are Convenience, Mobility, Content and Cost – **Dasgupta & Grover, 2019**

**Sujith et al., 2019** analyzed the customer perception towards mobile wallets. The study reveals that the majority of the respondents are aware and prefer the mobile wallet and prefer for digital payment.

**Khadim et al., 2018** studied the factors affecting brand loyalty and the impact of perceived social media communication with brand trust and brand equity. Social media is a very well-built platform and it has a significant impression.

**BL.Arora et al., 2018** examined the impact of social media advertising on millennial's preferences. The study concluded that the respondents' preferences for using social media Websites as they habitually read blogs, used social media platforms for comparison of different Products, sought opinions of professionals before buying a product, and the number of likes and dislikes had a significant impact on their choices.

**Khanna (2016)** in his report “A study on factors Affecting Subscription rates of Netflix in India: An Empirical Approach” stated that Indian consumers are more inclined to watch free content Online rather pay an emolument for the same. Low subscription of Netflix is due to the non- availability of Regional and local TV shows and movies.

**Ernst & Young** (2016) in the report “Future of Digital Content Consumption in India” stated that an increase in the usage of smartphones in India has stirred a new era of video consumption on the personal media devices. The penetration of smartphones in India is projected to grow to 520mn by 2020 and broadband dissemination will increase to 40% from 14% in 2020. Wherever this was made possible by an increase in the number of digital devices that support digital enhanced Internet speed and media. Netflix, Hulu, Amazon, Apple TV, etc. A new age of video has been stirred by an increase in smartphone use in India. The smartphone penetration in India is estimated to expand to 520 million by 2020 and broadband penetration will rise from 14% at present, to 40% in 2020.

## **RESEARCH METHODOLOGY**

The study is based on primary data by collecting responses through a survey method. Other than primary data content from news articles, industry research reports, International journals for accumulation of key trends were also analyzed. The sampling technique used wa convenience sampling. The sample included 300 respondents. The data for the study is collected through a structured questionnaire. The statistical tools such as tables, charts are used to present data. Percentage analysis and hypothesis testing are made for analysis of data.

## **RESULTS AND DISCUSSION**

**Table 1: Showing age of the respondents**

<b>Category-Age Group</b>	<b>Frequency</b>	<b>Percentage</b>
Below 20	24	8%
21-30	156	52%
31-40	69	23%
41-50	45	15%
Above 50	6	2%
Total	300	100%

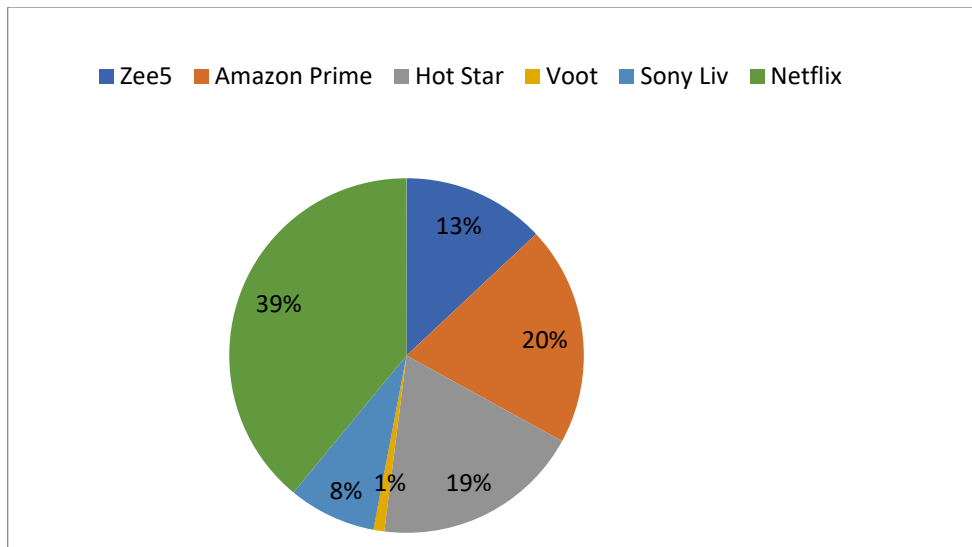
**Table 2: Showing gender of the respondents**

<b>Category-Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	99	33%
Female	201	67%
Total	300	100%

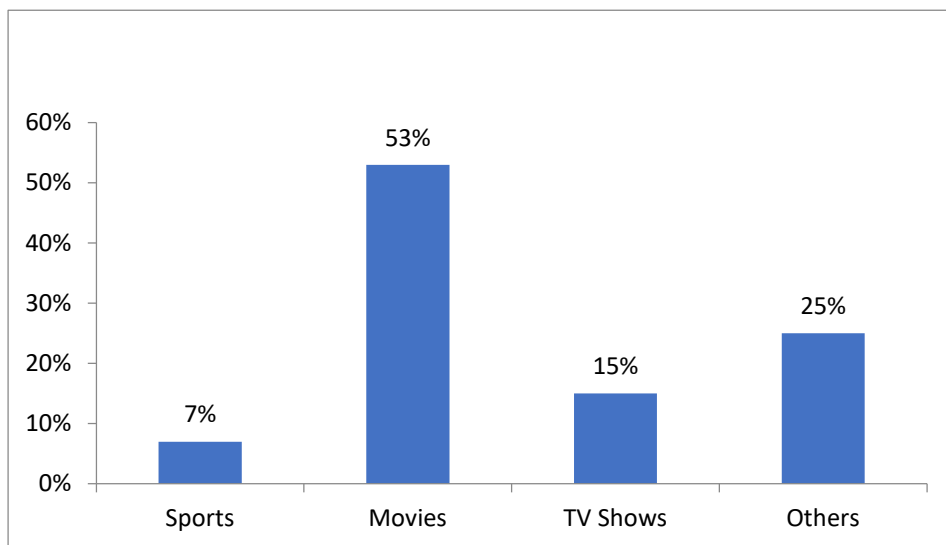
**Table 3: Showing family income of respondents**

<b>Category-Income Level</b>	<b>Frequency</b>	<b>Percentage</b>
Less than Rs.25000	69	23%
Rs.25000-Rs.50000	129	43%
Rs.50000-Rs.75000	60	20%
Rs.75000-Rs.100000	30	10%
Above 100000	12	4%
Total	300	100%

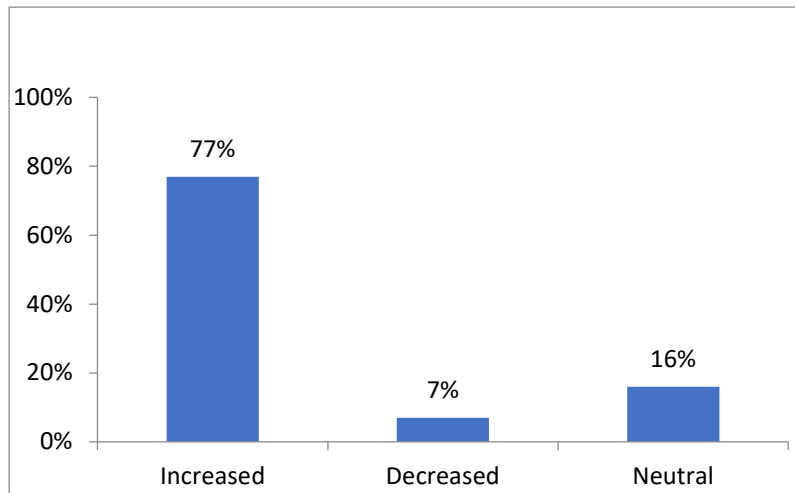




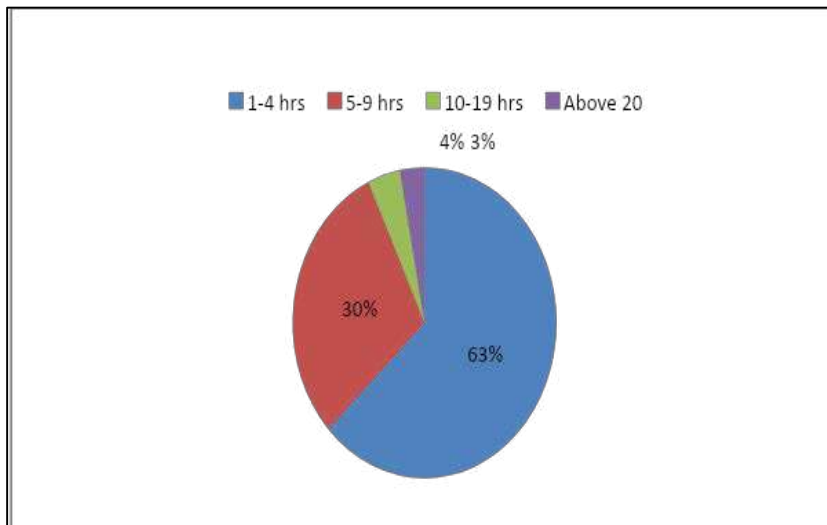
**Figure 1: Showing the respondents most preferred OTT platform subscribed**



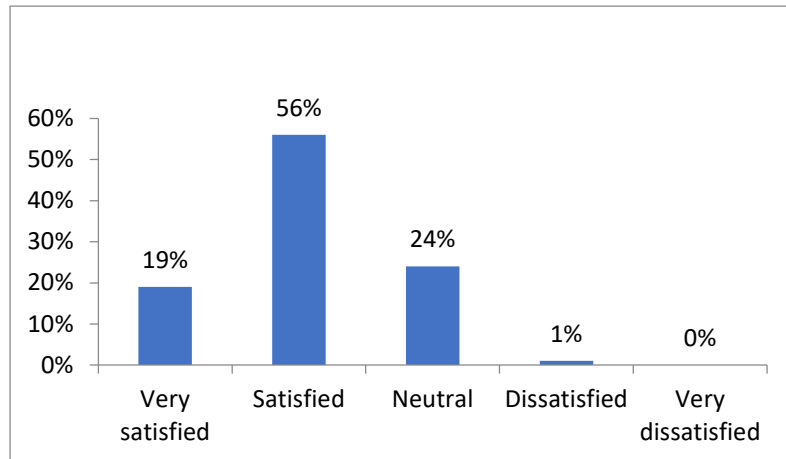
**Figure 2: Showing respondents preferred entertainment over online streaming platform**



**Figure 3: Showing respondent's opinion on change in OTT usage since lockdown**



**Figure 4: Showing increase in hours spend per week by respondent on streaming video since COVID-19**



**Figure 5: Showing the satisfaction level of OTT platform users**

Category of Aspects	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Percentage
Convenience	144	60	48	45	3	300	100%
Advertisement free service	93	123	72	12	0	300	100%
Cost Effectiveness	87	72	117	15	9	300	100%
Offline viewing facility	18	33	60	153	36	300	100%

**Table 4: Showing response on the motivation aspects that influences to use of OTT platform**

## Hypothesis Testing

A one way ANOVA is used to compare two means from two independent group using the F-distribution. Relationship between demographic factors such as age and income level of respondents and the motivational aspects influencing the users to opt for OTT platform is being analyzed.

### Hypothesis: 1

**H<sub>0</sub>:** There is no significant difference between age of the respondents and the motivational aspects influencing the users to opt for OTT platform.

**H<sub>1</sub>:** There is significant difference between age of the respondents and the motivational aspects influencing the users to opt for OTT platform.

**Table 1: Showing relationship between age of the respondents and the motivational aspects influencing the users to opt for OTT platform.**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32.019	16	2.001	13.363	.000
Within Groups	5.690	38	.150		
Total	37.709	54			

**Interpretation:** The above table shows the value as per the one way Anova test is 0.000, it is less than the 0.05 level of significant. So accept H<sub>1</sub>. There is significant difference between age of the respondents and the motivational aspects influencing the users to opt for OTT platform.

### Hypothesis: 2

**H<sub>0</sub>:** There is no significant difference between income level of the respondents and the motivational aspects influencing the users to opt for OTT platform.

**H<sub>1</sub>:** There is significant difference between income level of the respondents and the

motivational aspects influencing the users to opt for OTT platform.

**Table 2: Showing relationship between income level of the respondents and the motivational aspects influencing the users to opt for OTT platform.**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	91.269	22	4.149	16.534	.000
Within Groups	19.321	77	.251		
Total	110.590	99			

**Interpretation:**

The above table showing the value as per the one way Anova test is 0.000, it is less than the 0.05 level of significant. So accept H1. There is significant difference between income level of the respondents and the motivational aspects influencing the users to opt for OTT platform.

**FINDINGS AND SUGGESTIONS**

- All the respondents under the study are aware of OTT Platform and 46% of respondents were the daily users of OTT Platform. 27% of respondents were using it weekly especially during week end. 21% of respondents indicated on monthly usage and 6% of respondents stated of OTT Platform on yearly basis on long vacation breaks.
- Watching Sports on OTT platform were regularly viewed by 7% of respondents. 53% of respondents preferred and enjoyed watching movies over the OTT platform. 15% of respondents preferred TV shows, whereas the remaining 25% respondents were not very particular of any specific category and watched all programs in general.
- 48% of the respondent’s admitted on screen time consumption, was an impact of COVID-19 lockdown situation whereby members were impelled into watching shows individually. On a detailed investigation it was revealed that 77% respondents increased their usage of OTT platform. 63% of respondents increased usage by 1-4

hours per week of streamed videos since the pandemic. However 7% of the respondent's stated, there was decrease in their usage and 16% responded stated as they remained neutral to their usage of OTT platforms.

- 66% respondents opted for the use of new OTT Platform which in their opinion offered better features and bargains whereas all other respondents stated that they continued with their existing OTT platforms during the lockdown.
- The electronic devices generally made use of for OTT Platform content viewing during the lockdown were smartphones. 11% of respondents consumed through Televisions and another 11% used Laptops.
- 51% of respondents gladly agreed on having good access of internet connection that supported streaming video contents.
- 56% of respondents were satisfied in using OTT platform. The study reveals there is a significant difference between the age of the respondents and the motivational aspects influencing the users to opt for OTT platforms. There is also a significant difference between the income level of the respondents and the motivational aspects influencing the users to opt for OTT platform.

Better and effective subscription plans are to be acquaint with so as to cope up with the need for a majority of users who are occasionally consuming OTT platforms and increase new user acquisition. The OTT Platform service providers can create more general awareness about the negative impact of sharing login details with others and also implement steps on consumers for resisting the same. There should be more broadcasting of regional movies and programs which would give rise to an increased number of OTT consumers. The motivational aspects like offline watch and advertisement free service should be encouraged to increase the adoption of OTT platform. The relationship between the streaming platform and the consumers are to be strengthened through collection of critical user feedback which would help to maintain service excellence and retain your subscribers.

## **CONCLUSION**

The study finds that there is a discernible rise in the OTT as a preferred medium, a habit solidified during the lockdown period when COVID-19 pandemic was looming around. The main reasons for OTT popularity are subscription to virtually unlimited content at

convenience of the takers. Moreover, vital factors like increasing penetration of smartphones and smart devices and the availability of internet data at competitive prices have also influenced the users of OTT platforms. OTT platform is still getting more and more trending among the consumer. There tranquil exists in a section of the population that doesn't have access to smartphones and internet also the older generation still prefers the television over OTT platforms for entertainment. Most of the current users of the OTT platforms are quite satisfied with their experience and majority of the consumers tend to increase their consumption of OTT in future. This trend can be successfully explored by the different OTT platforms with better feature and responsible services. The OTT will further go through many changes and advancements to get the right model to give the customers a delightful experience.

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## **BONE CANCER DETECTION: A REVIEW**

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### **ABSTRACT:**

Cancer is a deadly disease caused by the growth of the cells. Different types of cancers are bone cancer, breast cancer, prostate cancer, lung cancer etc. Almost 70 percent of the people are suffering from different types of cancer. Of these the most commonly spread one is bone cancer, which may lead to death at the late stages of detection. Bone cancer detection is very important and early diagnosis save the life of a person. Doctors use MRI image, CT image to identify bone tumor cells which is a time consuming process. So it is very important to develop an automated system which will categorize a bone as healthy or cancerous one. A lot of machine learning algorithms are developed to detect and classify bone tumor cells. This paper uses a comparative study of various machine learning algorithms to detect and classify bone cancer cells. The outcome of the suggested method demonstrate a higher accuracy of early diagnosis of bone cancer.

**Keywords: Bone cancer detection, Diagnosis**

## INTRODUCTION:

Human skeletal system is made up of 206 bones. Bones protect the internal organs, allow people to stand upright, and attach to muscles, which allow movement. Cancer can start in any part of any bone. Cancer begins when healthy cells in the bone change and grow out of control, forming a mass called a tumor. A bone tumor can be cancerous or benign. A cancerous tumor is malignant, meaning it can grow and spread to other parts of the body. A malignant tumor can destroy the bone and spread to nearby tissue. If these bone tumor cells get into the bloodstream, they can spread to other parts of the body, especially the lungs, through a process called metastasis. A benign tumor means the tumor can grow, but it will not spread to other parts of the body. Even though a benign tumor does not spread outside the bone, it can grow large enough to press on surrounding tissue, weaken the bone, and cause the bone to fracture.

Cancers that start in the bones are called primary bone tumors. Bone cancers that start in another part of the body (such as the breast, lungs, or colon) are called secondary or metastatic bone tumors

There are different types of connective tissue cancers of the bone:

Chondrosarcoma. Chondrosarcoma is cancer of the cartilage. It is more common in adults.

Chordoma. This type of bone sarcoma typically starts in part of the spinal cord.

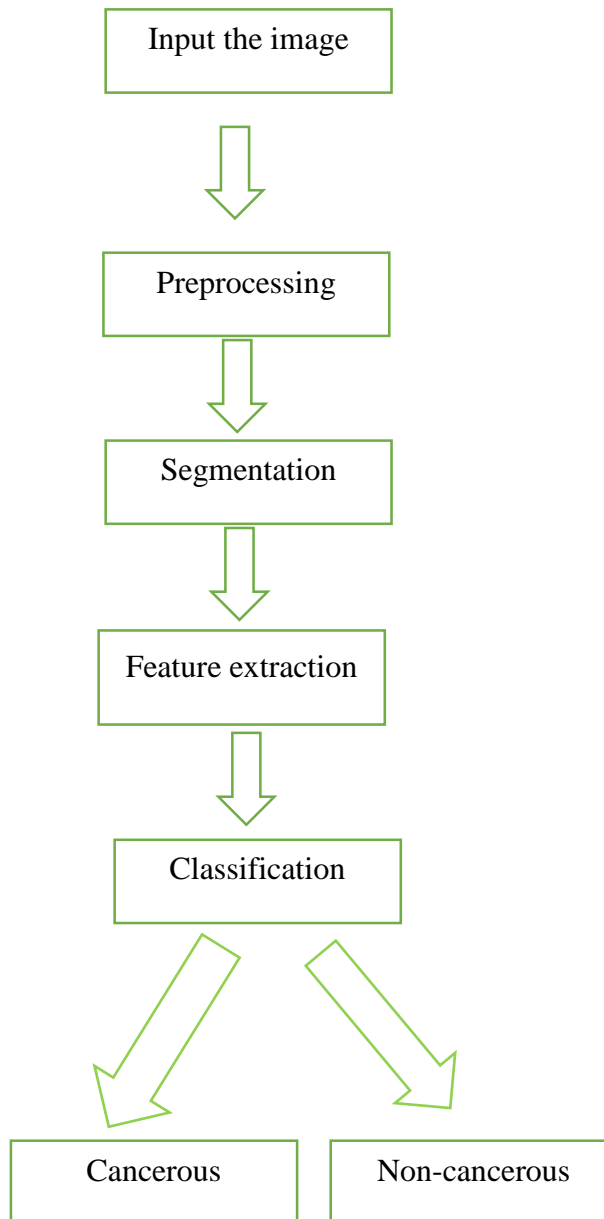
Ewing sarcoma and osteosarcoma. These are 2 of the most common types of bone sarcoma. They mainly occur in children and young adults.

Ewing sarcoma is unusual in that it can occur in bone or soft tissue.



**Figure1: Normal and cancerous bone**

## METHODOLOGY



**Figure 2: Stages in Detection process**

## **LITERATURE REVIEW:**

Sinthia P & K. Sujatha [1] suggested a novel approach to bone cancer detection using the K means algorithm and edge detection process. Sobel edge detector is used to detect the edge and K means clustering algorithm is used to detect the tumor region. In the proposed method the noisy input image is taken and it can be transformed into levels with wavelet transform, the boundaries are found out using edge detection algorithm, segment it and extract the feature and detect the tumor cells.

Kishor Kumar Reddy, Anisha P R, Raju G V S [2] proposed a novel approach to detect tumor size and bone cancer stage using Region growing algorithm. In the proposed method it will identify the region of the bone cancer, find out tumor size and based on the size the stage of the cancer can be analyzed after the segmentation by Region growing algorithm.

Maduri Avula, Narasimha Prasad Lakkakula, Murali Prasad raja [3] suggested a method to detect bone tumor cells. This method uses K means clustering for image segmentation and after that the extracted segmented image evaluate the mean pixel intensity in the region of interest. Based on that value thresholding detection is done. 95% accuracy will be achieved by this method.

Ambalkar, Sonal S., and S. S. Thorat [4] proposes a machine learning algorithm for the detection of the bone cancer cells which uses the MRI images. The algorithm can be implemented in Opencv. It can be implemented in python. To detect the tumor which can be carried out by using the MATLAB function for connected components which will simply select out the area with maximum connected component and the remaining area will be discarded.

Krupali D. Mistry, Bijal J. Talati [5] suggested a method for detection bone cancer cells using MRI images. It proposes an approach to detect bone cancer using image processing, K-means integrated with Fuzzy C-means clustering and tumor can be identified by mean pixel intensity of segmented image. 98% accuracy can be obtained by this method.

Abdulmuhssin Bin Hassan [6] proposes an approach to detect enchondroma tumor in MR images. It uses Matlab application, preprocessing can be done using average filter and bilateral filter and thresholding segmentation and morphological operation are the two

operations that can be used for image segmentation.91.3% accuracy was obtained in this method.

Boulehmi, Hela, Hela Mahersia, and Kamel Hamrouni [7] introduces a new method for the bone cancer detection using Generalized Gaussian Density analysis (GGD).The input can be the MRI images and it will generate a sub images of a given size and perform GCD analysis on each sub images. After that a Region of interest (ROI) with highest value of shape parameter can be selected. A Euclidean distance to adjust ROI and identify bone tumor cells can be employed.

P. Nisthula, R.B. Yadhu [8] used an edge detection technique to identify the tumor region on bone CT images. The edge detection includes the use of Components from Sobel operator and second derivative of Sobel operator.

Hossain, Eftekhar, and Mohammad Anisur Rahaman [9] uses adaptive neuro fuzzy inference system (ANFIS) for the classification of benign and malignant bone cancer. Gray level co-occurrence matrix (GLCM) features have been taken from the MR images.The classification result has been evaluated based on three performance matrices accuracy, sensitivity and specificity. The proposed classification technique provides 93.75% accuracy.

Eftekhar Hossain, Md. Farhad Hossain and Mohammad Anisur Rahama [10] suggested a method to detect and classify bine cancer cells using KNN classifier with an accuracy of 92.5%.

SL.NO	PAPER	METHODOLGY
1	A Novel Approach To Detect Bone Cancer Using K-Means Clustering Algorithm And Edge Detection Method	Sobel edge detector and K means clustering algorithm
2	A novel approach for detecting the tumor size and bone cancer stage using region growing algorithm	Tumor size and Region Growing algorithm
3	Bone cancer detection from MRI scan imagery using Mean Pixel Intensity	K means clustering and Mean pixel intensity
4	Bone Tumor Detection from MRI Images Using Machine Learning.	Super pixel segmentation, Mean pixel intensity
5	Integrated Approach for Bone Tumor Detection from MRI Scan Imagery	K-Mean;, Fuzzy C-Means Mean pixel intensity
6	Enchondroma tumor Detection	average filter and bilateral filter and thresholding segmentation and morphological operation
7	Bone Cancer Diagnosis Using GGD Analysis.	GGD analysis, Euclidean distance, Shape parameter $\alpha$
8	A novel method to detect bone cancer using image fusion and edge detection	Sobel operator, image fusion.
9	Bone Cancer Detection & Classification Using Fuzzy Clustering & Neuro Fuzzy Classifier.	Fuzzy C-mean Clustering, Gray

		level co-occurrence matrix, Adaptive neuro fuzzy inference system
10	<p>An Approach for the Detection and Classification of Tumor Cells from Bone MRI Using Wavelet Transform and KNN Classifier</p> <p>An Approach for the Detection and Classification of Tumor Cells from Bone MRI Using Wavelet Transform and KNN Classifier</p> <p>An Approach for the Detection and Classification of Tumor Cells from Bone MRI Using Wavelet Transform and KNN Classifier</p> <p>An Approach for the Detection and Classification of Tumor Cells from Bone MRI Using Wavelet Transform and KNN Classifier</p>	<p>KNN classifier</p> <p>Wave let transform</p>

**Table 1: Comparison of Various algorithms**

**CONCLUSION:**

Bone cancer is one of the most deadly diseases, early treatment can reduce mortality rate. But the most challenging task is the detection of bone tumor cells in the early stages. A lot of techniques can be implemented in the above literature review but all the methods can have its own pros and cons. All the methods used image processing stage, segmentation, feature extraction and last one as classification. All the technology discussed is exclusively used for the detection of bone cancer which uses two types of data namely training data and testing data and it will categorize the image into cancerous or non-cancerous. The performance can be measured using the accuracy.

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**A STUDY ON “WOMEN EMPOWERMENT THROUGH  
KUDUMBASREE” WITH SPECIAL REFERENCE TO KANJOOR  
GRAMA PANCHAYATH.**

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**ABSTRACT**

The study focuses on the various programmes that were introduced by Kudumbasree to empower the women in Kanjoor Grama Panchayath. Data collected from 100 respondents using questionnaire to assess the effectiveness of Kudumbasree socio economic empowerment of women in Kanjoor grama panchayath after the involvement in Kudumbasree. The finding reveals that there is significance difference between age and the socio-economic changes by kudumbasree units and also There is significance difference between socio-economic changes by kudumbasree units and the educational qualification of members of kudumbasree units. women workers of Kudumbasree who are working on monthly wages, decision -making power in self-matters, household activities, skill and awareness of the members are improved. The members admitted that, their socio- economic status improved after joining Kudumbasree. Women workers should give due consideration for developing self- confidence and knowledge about intellectual rights. Each unit of kudumbasree must give attention to the various factors for the empowerment of women

**Keywords: Kudumbashree, women empowerment,**

## INTRODUCTION

Kudumbasree, the poverty eradication mission of the state of Kerala, is a community based self-help initiative involving poor women. It has been predicted as a tactic to poverty lessening focusing largely on micro finance and micro enterprise development, and fundamentally linked to local self-government institutions (Taramol, 2014). National Bank for Agriculture and Rural Development (NABARD) initiated women Self Help Groups (SHGs) in India with the support of local NGOs. The formation of SHGs led to the implementation of Swarna Jayanthi Gram Swarozgar Yojana (SGSY), launched by the Ministry of Rural Development. In a similar line Kudumbasree is sponsored by local self-government institutions in Kerala. Though local government institutions are not organically linked to Kudumbasree, they are active partners in the programme.

In 1998 Government of Kerala introduced Kudumbasree scheme as a comprehensive poverty alleviation programme to focus primarily on poor rural and urban women. The aim of the Kudumbasree scheme is to improve the standard of living of poor women in rural areas by setting up micro-credit and productive enterprises. It opened a new string of expected events in our development history. Kudumbasree is the poverty eradication mission of the state of Kerala. It is a community-based self-help initiative involving poor women. “Kudumbasree” in local language means prosperity of the family which helps enjoy the economic opportunities by a good number of the poor women folks in rural and urban Kerala. It makes every effort to alleviate poverty through an integrated approach which involves an affective convergence of resource and actions, and moreover, the programme is essentially linked to local self-government institutions. Though local government institutions are not organically linked to Kudumbasree, they are active partners in the programme. Today, Kudumbasree is one of the largest women empowering scheme in the country.

To eradicate absolute poverty in ten years through concerted community action under the leadership of local government, by facilitating organisation of the poor for combining self-help with demand led convergence of available services and resources to tackle the multiple dimensions and manifestations of poverty holistically” is the mission statement of Kudumbasree programme.

## **1.1 STATEMENT OF THE PROBLEM**

Poverty is a serious problem faced by all developing and underdeveloped countries in the modern world. It is felt that the problem of poverty can be solved through a concentrated endeavour by the State. Viable opportunities can be provided to the underprivileged and the destitute by means of lending asset creating facilities. Women households are the cruellest victims of deprivation and destitution. Poverty eradication programs must aim at improving the standard of living and empowerment of the women. The present study focuses the influence of various factors on women empowerment through kudumbasree and to find out the various problems faced by Kudumbasree Units in Kanjoor Grama Panchayath.

## **1.2 OBJECTIVES OF THE STUDY**

- To identify the various factors that influence women empowerment.
- To assess the effectiveness of Kudumbasree in the socio-economic empowerment of women.

## **1.3 HYPOTHESIS FOR THE STUDY**

H<sub>0</sub>: There is no significant difference between age and the socio-economic changes by kudumbasree units.

H<sub>1</sub>: There is significant difference between age and the socio-economic changes by kudumbasree units.

H<sub>0</sub>: There is no significant difference between socio-economic changes by kudumbasree units and the educational qualification of members of kudumbasree units.

H<sub>1</sub>: There is significant difference between socio-economic changes by kudumbasree units and the educational qualification of members of kudumbasree units

## **DATA AND METHODOLOGY**

Primary data is collected from 100 respondents of Kanjoor Grama panchyath using structured questionnaire. Population consists 450 kudumbasree members. Simple random

sampling technique was used for data collection. The analysis and interpretation were done with the help of Percentage Analysis and Weighted Mean and SPSS.

## **REVIEW OF LITERATURE**

**Jone Joseph, Jincy George, Amazon publishers, USA (2020):** A study on the importance of microfinance on Kudumbasree units. The most widely published feature of Kudumbasree is the setting up of microfinance using local resources as well as skills. Micro finance in India started in 1980s with small efforts or forming informal SHG to provide access to much needed saving and credit services to the marginal population more importantly in rural areas.

**SR Shehnaz, S. Suresh Kumar, International Journal of Entrepreneurship and small Business (2019):** “Women empowerment enticed family prosperity an empirical evaluation of performance of micro enterprises under Kudumbasree mission in Kerala”. Kudumbasree, meaning the families prosperity is one of the flag slip programmes of

Kerala. The study focuses on review of the production, marketing, profitability and Government support and women empowerment issues faced by micro enterprise unit under Kudumbasree.

**Joseph et.al (2018):** have conducted a study on “Kudumbasree Successful women empowerment model” and the results showed that socio-economic empowerment of women has increased through the Kudumbasree.

**Annie John (2017):** suggests that through Kudumbasree, women must increase their confidence in banking and money transactions. They can improve their communication skills and abilities in project planning and implementation. The participation of women in social events and public meetings has greatly improved. Kudumbasree increased entrepreneurship and leadership and increased the ability of women to work and earn together. He points out that Kudumbasree has improved the ability to perform accordingly through the participation of women.

**Nehajoan Panackal (2017):** pointed out in his study ‘Kudumbasree and women empowerment in Kerala- An overview and theoretical framework’, that there is positive changes on social and family empowerment after becoming a part of SHGs. It helped in getting capital and the facilities provided by savings banks and post offices. Women

entrepreneurship and asset creation is the most important thing that promoted members to join SHG as it helps for socio economic upliftment.

**Selvi and Pushpa (2017):** have conducted “A study on sustainability of women empowerment through Kudumbasree”. Their study results revealed that the level of empowerment was found to be medium among 55 percent of the respondents, high level of empowerment was found among 19 percent of respondents and low level of empowerment was found among 26 percent of respondents. The study has concluded that Kudumbasree had created a good impact on the empowerment of women in Kerala.

**Minimol MC & Mukesh K G (2016):** in their study ‘Empowering rural women in

Kerala-a study on the role of SHG’, undertaken to critically evaluate the role played by SHG in imparting social, economic, and financial empowerment to the rural women. Exploratory research design is used for the study. And examined that the concept of SHGs for rural women empowerment has not yet run its full course in attaining its objectives. Further efforts in refining group characteristics and realigning group objective can ensure furtherance of effectiveness of SHGs in translating rural women into a more powerful section of the society.

**Lathika K K (2016):** in her study ‘A study on women empowerment in Kerala with special reference to Kudumbasree project’, made an effort to assess the level of empowerment of the respondents at individual level, to measure the empowerment status at group level and to identify the problems confronted and opinion on matters particularly affecting them and analysed that Majority in sample refrain from engaging in any type of micro entrepreneurial activity. Uncongenial family atmosphere has emerged the principal factor checking the entry of women respondents into the micro entrepreneurial arena followed by absence of responsible person to assume the rein of the activity.

**Ansa Salim (2015):** reveals that “Women empowerment through long term orientation with special reference to SHGs groups”. The study mainly focused on financial aspects of the units how Kudumbasree improved the status of women financially the growth of employment the financial support through the project.

**Bhagyalakshmi(2015):** It has been observed that in India, women are discriminated against and marginalized at every level of the society whether it is social participation, political

participation, economic participation, access to education, and also reproductive health care. Women are found to be economically very poor all over India.

A few women are engaged in services and other activities. So, they need to. Economic power to stand on their own leys on part with men.

**Dhanya John (2015):** on her study "Women empowerment through various schemes and analysis", reveals that Kerala's high levels of human development, and gender development and the consequent gender empowerment are the result of its achievements in the field of health and education for women.

**Jagadeewari (2015):** found that women have become confident about their future and have attained a considerable level of Self-reliance and thereby increase in the economic conditions after joining the member of the organization.

**Jomy Jose (2015):** has conducted a study on role of Kudumbasree in women empowerment in which he found that Kudumbasree was able to achieve social and economic development of women and also had a direct influence over the living status, health, education and nutritional needs of the women.

**Reddy (2014):** in his paper "Rural women empowerment and entrepreneurship development in India" deals with the empowerment of rural women through entrepreneurship and the advantages of entrepreneurship among the rural women in India.

**Venugopalan K (2014):** in his study on the influence of Kudumbasree on women empowerment has found that out of the total respondents surveyed, majority of the respondents were daily wage earners and whose monthly income was found to be low. The study concluded that women empowerment was achieved by Kudumbasree only to a limited extend.

## **KUDUMBASREE**

Kerala Model of Development is widely discussed throughout the world. Kerala had witnessed the radical reforms like caste reform movements of 19th and 20th centuries and the peasants and labour movements in the second half of the 20th century. Kudumbasree was launched by the Government of Kerala in 1998 with an aim to eradicate poverty in rural and

urban areas of Kerala through community development schemes, under the leadership of Local Self Governments. The slogan of the mission is

“Reaching out to families through women and reaching out to community through families”. It is now considered as one of the largest women-empowering projects in India. The programme is linked to local self-government institution and it makes all the effort to alleviate poverty through an integrated approach involving effective union of resources and action. It combines different kind of activities like thrift and credit, micro enterprises, income generating activities and a wide range of welfare activities.

Kudumbasree chooses a family-based approach; it reaches the family through women and the community through these families. Kudumbasree forms self-help groups with members preferably from the same socio-economic background and a village-based financial intermediary usually composed of 10- 20 local women. Each member makes a small regular savings contribution over a few months for generating a capital within the group. The collected funds may then be lend back to the members to serve different purposes. Many SHGs are associated with banks for the delivery of micro-credit. The Reserve Bank of India has issued instructions permitting the nearest Commercial or Regional Rural Bank, or even a Cooperative Bank to open Savings Bank account for SHGs. Kudumbasree is thus granted the same privileges. It thus chooses to focus on three major aspects i.e.; Women empowerment, economic empowerment and social empowerment through the use of such funds.

### **3. OBJECTIVES OF KUDUMBASREE PROGRAMME**

The main objective of Kudumbasree programme is women empowerment. The other objectives are:

- Identification of the poor families through risk indices-based surveys, with the active participation of the poor communities which they belong.
- Empowering the poor women to improve the productivity and managerial capabilities of the community by organizing them in to Community Based Organization.
- Improving incomes of the poor through improved skills and investment for self-employment.



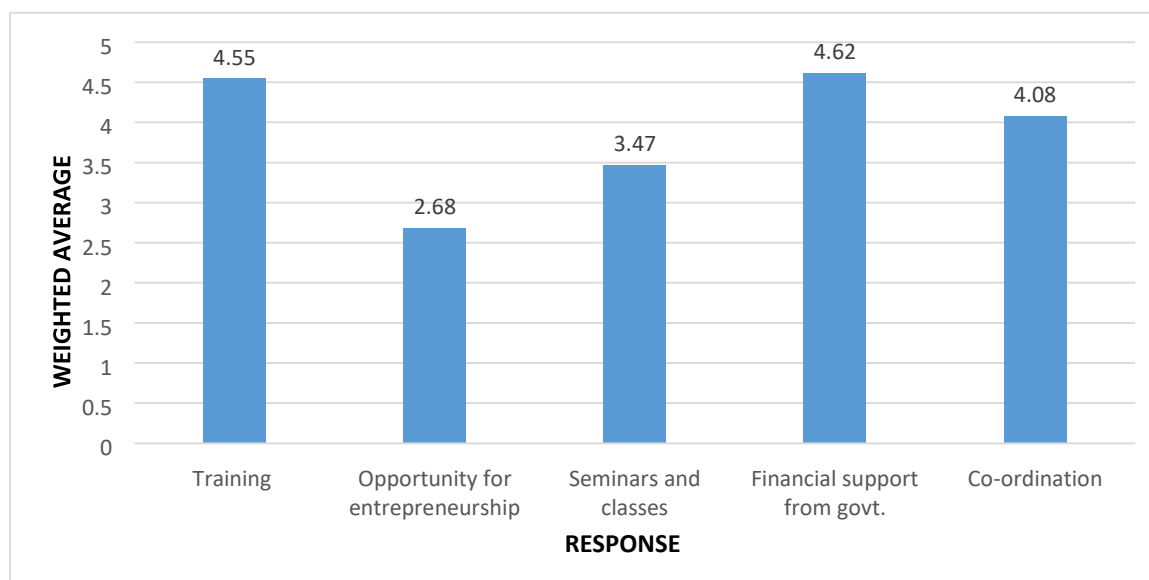
## DATA ANALYSIS AND INTERPRETATION

### Interpretation

**Table 4.21 Factors influencing women empowerment**  
**Empowerment**

Factors	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Weighted Average
Training	66	25	7	2	0	4.55
Opportunity for entrepreneurship	59	31	6	4	0	2.68
Seminars and classes	42	28	12	2	0	3.47
Financial support from govt.	72	19	8	1	0	4.62
Co-ordination	44	30	18	6	2	4.08

**Source: Primary data**



**Figure 4.21 Factors kudumbasree helps women empowerment**

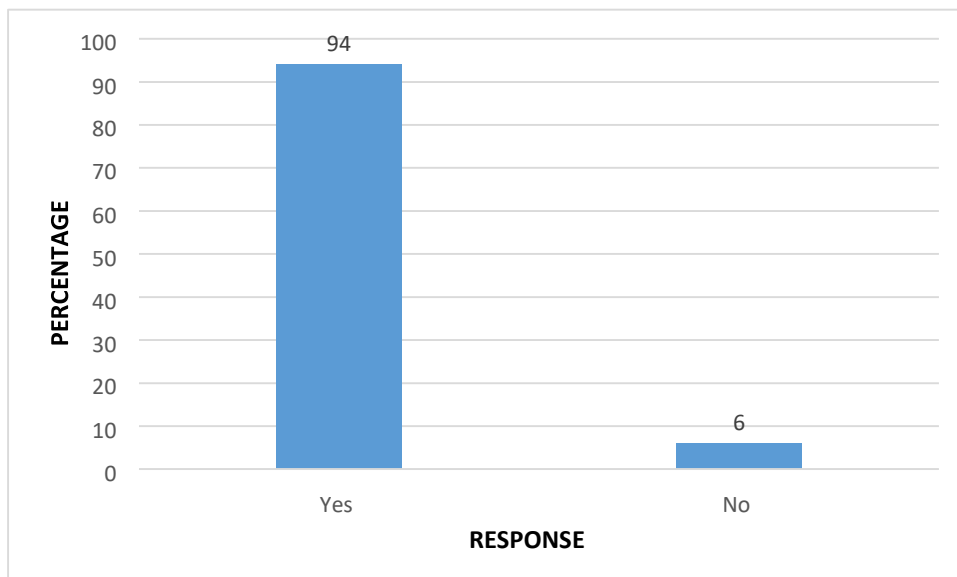
### Interpretation

From the study it is clear that Training ,financial support and coordination are most important factors that leads to women empowerment. Only upto a certain extent seminars and classes paved the way to boost the entrepreneurial traits among women entrepreneurs.

**Table 4.22 showing the change in family or social relationship after joining kudumbasree unit**

Changes	No of respondents	Percentage
Yes	94	94
No	6	6
Total	100	100

**Source: Primary data**



**Figure 4.22 showing the change in family or social relationship after joining kudumbasree unit**

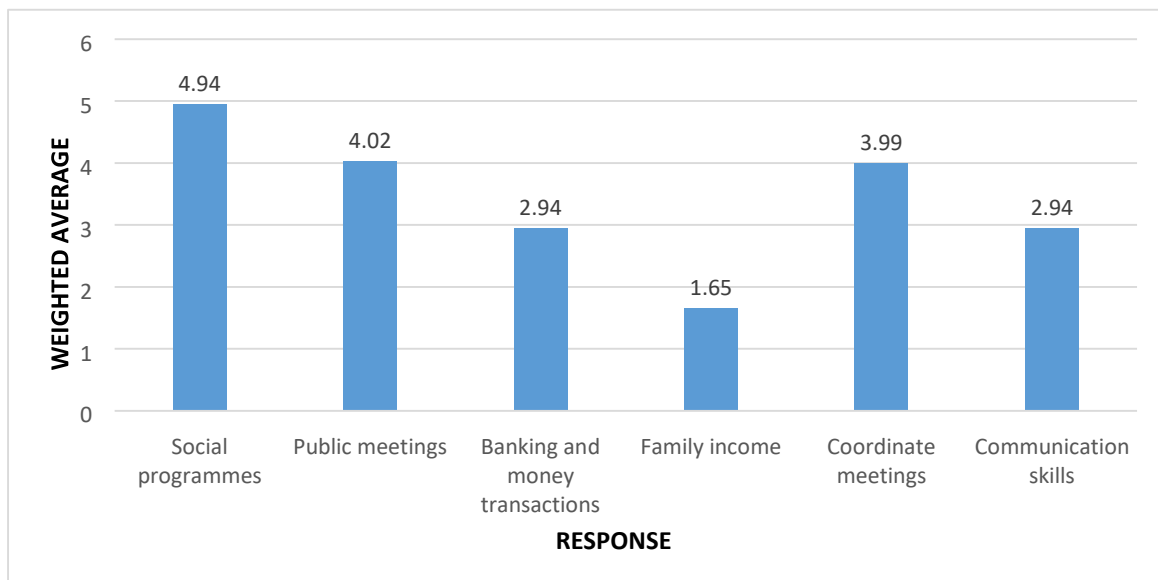
**Interpretation**

The Table 4.22 highlights that 94% of the respondent’s family or social relationship have changed after joining kudumbasree. And the remaining 6% shows there is no changes.

**Table 4.23 showing the socio-economic changes through kudumbasree**

Heads	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Weighted Average
Social programmes	95	4	1	0	0	4.94
Public meetings	6	90	4	0	0	4.02
Banking and money transactions	14	19	26	29	12	2.94
Family income	2	6	9	21	62	1.65
Coordinate meetings	5	90	4	1	0	3.99
Communication skills	14	19	26	29	12	2.94

**Source: Primary data**



**Figure 4.23 showing the socio-economic changes through kudumbasree**

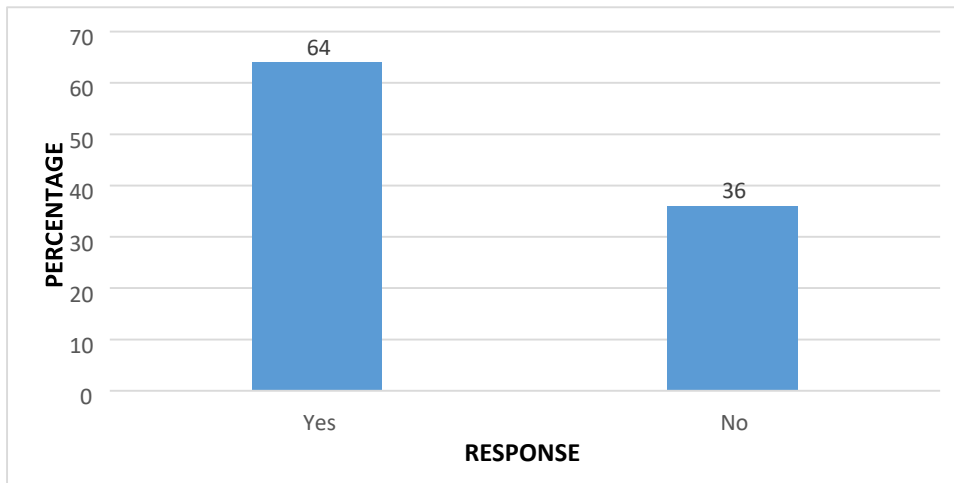
**Interpretation**

Kudumbasree has enabled socio-economic changes in the study subjects as shown in Table 4.23 majority of respondents strongly agree that their participation in social programmes has improved after joining kudumbasree. About 90% of the respondents that their participation in public meetings and ability to coordinate meetings and express opinions agreed to improve after joining kudumbasree. Improvement in confidence in banking, money transactions and also communication skills was 95% are strongly agreed. But average weight 1,65 is reported that their family income has not improved after joining kudumbasree and 62% are strongly disagreed.

**Table 4.24 showing the kudumbasree schemes helps in improve position of women in family**

	No of respondent	Percentage
Yes	64	64
No	36	36
Total	100	100

**Source: Primary data**



**Figure 4.24 showing the kudumbasree schemes helps in improve position of women in family**

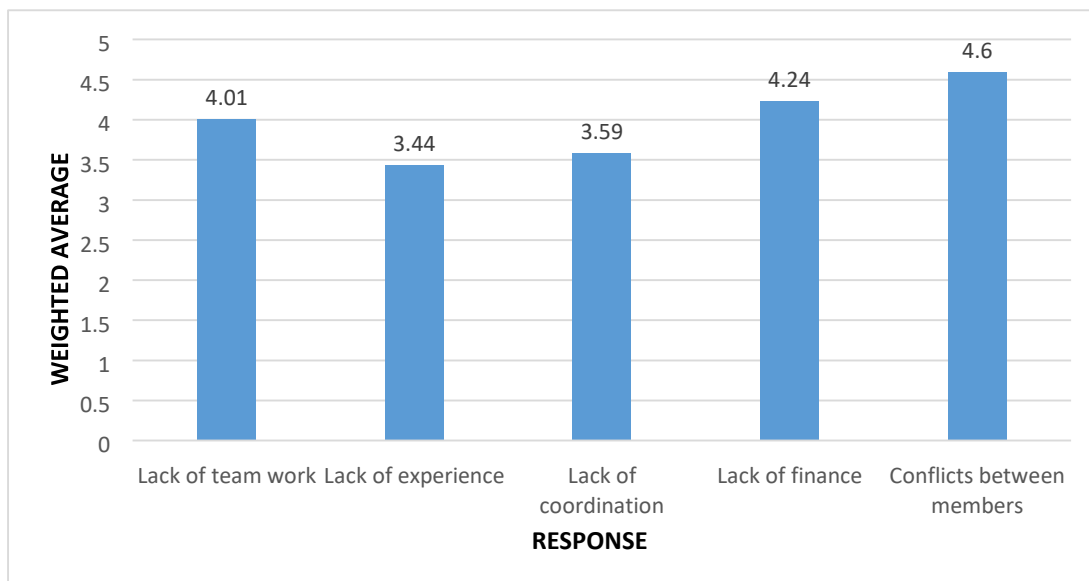
### **Interpretation**

The Table 4.25 highlights that 64% of the respondents get helps from kudumbasree schemes to improve their position in family. And the remaining 36% shows there is no improvements in the family.

**Table 4.25 showing the problems**

Problems	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Weighted Average
Lack of team work	54	23	2	12	9	4.01
Lack of experience	20	26	34	18	2	3.44
Lack of coordination	46	16	8	11	19	3.59
Lack of finance	67	12	6	8	7	4.24
Conflicts between members	84	4	3	6	3	4.60

**Source; Primary data**



**Figure 4.25 showing the problems**

**Interpretation**

### **HYPOTHESIS: 1**

H<sub>0</sub>: There is no significance difference between age and the socio-economic changes by the kudumbasree units.

H<sub>1</sub>: There is significant relationship between age and the socio-economic changes by kudumbasree units.

### **ONE WAY ANOVA TEST**

#### **ANOVA**

a1

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.914	2	2.957	3.346	.039
Within Groups	85.726	97	.884		
Total	91.640	99			

### **Interpretation:**

The above table showing the values as per the one way Anova test is 0.039, it is less than the 0.05 level of significant. So we accept the H<sub>1</sub>. There is significance difference between age and the socio-economic changes by kudumbasree units.

### **HYPOTHESIS: 2**

H<sub>0</sub>: there is no significance difference between socio-economic changes by kudumbasree units and the educational qualification of members of kudumbasree units.

H<sub>1</sub>: There is significance difference between socio-economic changes by kudumbasree units and the educational qualification of members of kudumbasree units.

## ONE WAY ANOVA TEST

### ANOVA

E1

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	27.095	2	13.547	17.370	.000
Within Groups	75.655	97	.780		
Total	102.750	99			

### Interpretation

The above table showing the value as per the one way Anova test is 0.000, it is less than the 0.05 level of significant. So we accept  $H_1$ . There is significance difference between socio-economic changes by kudumbasree units and the educational qualification of members of kudumbasree units.

## RESULTS AND DISCUSSION

Majority of the respondents belong to the category of above 45 and have SSLC qualification. According to the study, most of the members are married. The highest number of earning members in the family is two. Women workers of kudumbasree units 5-10 years experience in kudumbasree unit and they are working on monthly wages. The decision - making power in self-matters, household activities, skill and awareness of the members are improved. The members admitted that, their socio- economic status improved after joining Kudumbasree. Women workers should give due consideration for developing self-confidence and knowledge about intellectual rights. Each unit of kudumbasree must give attention to the various factors for the empowerment of women.

## **SUGGESTIONS**

- Continuous and effective training programmes must be arranged to create awareness among the members about the new initiatives of the Kudumbasree project.
- Long duration funding with low interest rates is required for sustainable women empowerment and entrepreneurial activities.
- Support from family is the most important factor of women empowerment. So, it should be accurate.
- Women empowerment and awareness programme should be conducted at regular intervals.
- Active participation of Kudumbasree members in gramasabhas is to be insisted
- 24 X 7 Helpline members are required for proper guidance.

## **CONCLUSION**

Economic development is the base for other development. Collective effort has been recognized as tenets of women empowerment. Women empowerment leads to sustainable social development. Economic development of women leads to better living status in the family, educational, nutritional, and the health needs of the children were satisfied. Economic independence through kudumbasree improved the social participation of its members and the SHG movement is supporting for social empowerment of poor women flock. The study has provided an insight on women empowerment acquired by Kudumbasree members after joining in the Kudumbasree unit. To conclude, women empowerment leads to economic development of the design through the Kudumbasree project.





**A STUDY ON CUSTOMER PERCEPTION TOWARDS GOOGLE PAY WITH  
SPECIAL REFERENCE TO CHALAKUDY TOWN**

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**ABSTRACT**

Digital payment system is gaining acceptance. There are several forms of digital payment systems. Google Pay is one of the most prevalent digital wallet platforms and online payment systems industrialized by Google to power in-app and tap-to-pay purchases on mobile devices enabling a simple and safe scheme to transfer money instantly with Android phones, tablets or watches. In this fast and busy world, the implication of Google Pay is increasing day by day. This study tries to identify the motivational factors which influence customers to use Google pay and evaluate different variables that affect the usage of Google Pay.

**Keywords:** *Digital payment system, Google Pay, Customer perception*

## **INTRODUCTION**

India is moving forward on the way to the most significant digital uprising and digital payment system which will be an imperative landmark in the regime of cashless economy in the coming years. Digital payment system is an electronic medium that permits consumers to make electronic commerce transactions for their procurement and also monetary transactions. Digital payment system has had notable impetus particularly after demonetization in India. Net banking and UPI payments have made payments safe, secure and sooner. Mobile wallet is an approach of digital payment mechanism that allows the customers to pay by uploading the cash from their bank account to the wallet account which is auxiliary transferred to the other party. Google Pay is one of the most popular digital wallet platforms industrialized by Google. These days the lifestyle of the people is getting too busy and thus the significance of Google Pay is increasing day by day. Google Pay is safe to make payments since it guards the customer's money with a world class security scheme that aids to sense fraud and prevent hacking. It precautions the customer's account with screen lock like fingerprint, pattern etc. Google pay constantly retains customer's money safe, with a unique UPI and Google pin.

## **STATEMENT OF THE PROBLEM**

Over the last few years the traditional payment system has been altered by recent technological developments. The cash payment system got changed into a digital payment system. Digital wallet is a kind of digital payment mechanism. Google pay is the most popular digital wallet used by the people. A study on customer perception towards Google pay is conducted to analyze customer's awareness towards Google pay and also to identify the motivational factors that influence the customers to prefer Google pay.

## **OBJECTIVES OF THE STUDY**

- To analyze customer's awareness towards Google Pay.
- To find out the satisfactory level of customers while using Google Pay app.
- To identify the motivational factors which influence customers to use Google Pay.

## **SIGNIFICANCE OF THE STUDY**

Due to speedy growth of technology, the traditional payment mechanism has been reformed to the digital payment system. Today the world is moving to a cashless economy. Due to handiness and ease of use, customers prefer using mobile wallets than paper cash for making payments. Google Pay is an application which empowers the customers to make payments easily through mobile phones. Thus this study is conducted to analyze the customer's perception towards Google Pay. However, the study was confined to Chalakudy town only and therefore the findings of the study cannot be extended to other areas. Time and cost are other factors limiting the study to a sample of 100 respondents.

## **REVIEW OF LITERATURE**

**Kaur, Puneet, et al (2020)** examines that mobile wallet apps have been increased trend vividly. It is useful for customers and effectiveness towards transactions and security payments on behalf this still the mobile wallets not extended in markets.

**Ghosh, Gourab (2021)** defines that progression of information and communication technology unlocked the gate way for modern methods of payments. The growth in smart phone and access to internet made life stress-free for the people and which furnished advent to digitalization. Digitalization not only upgraded trade and commerce but it also made transaction of payment smooth and fast.

**Gupta, Knavish, and Nupur Arora (2020)** shows that apparent ease of use and perceived usefulness have a constructive impact on attitude to adopt mobile payment systems. Also, there exists a considerable positive relationship between attitude to embrace mobile payment systems and purpose to adopt mobile payment schemes.

**Mishra, A. B. (2020)** The increase of the ability and strength of wireless offers affords right opportunities for rising up offerings to customers. Businesses are starting to recognize that e-payment system is the important thing to boost their brand differentiation, boost sales, customer satisfaction and hold up with competitors. In the present-day, e-payment approach has been entered in finance, services, retails, telecommunication and IT/ITES sectors related business organizations. The recent transaction of BHIM wallet has been received three times growth in only one financial year 2019-20.

**Pasupathi and Reka (2019)**, in their article entitled “A Study on Customers Perception towards Mobile Wallet with Special Reference to Google Pay”, with an understanding to find out the customers’ Perception towards Google Pay. A well-structured questionnaire has been used to collect the data from 150 customers in Tiruchirappalli by adopting simple random sampling method. Data have been analysed using tools like simple percentage, Chi-square test, ANOVA and Correlation. The study reveals that majority of the customers are satisfied with overall opinion about Google pay. It is also established that there is a positive relationship between the whole opinion and mode of payment.

**Saviour F (2019)** in his study analysed the various factors which results in consumer satisfaction. The researcher’s main focus is on the satisfaction level of paytm users. Researcher has identified the justifications for dissatisfaction of consumer towards the e-wallet services and also the researcher made a struggle to seek out propositions to enhance the paytm services. Study concluded that the majority of the respondents are gratified with the services of paytm, due to simple access, increased usage of smart phones and cashless economy.

**Dr. Mamta Brahmhatt (2018)** endeavors to learn and measure the customer’s perception regarding E-wallets in Ahmadabad city. She concludes that the implementation image of E-Wallet among consumers in Ahmadabad has already crossed the beginning phase, to be fruitful in E-Wallet market now depends profoundly depends on the marketing strategies of E-Wallet companies as well as the financial policy makers.

**Tanzila Ayaz Sayed et.al (2018)**, in their research captioned “A Study of Customer Satisfaction Level and Customer Perception of E-Payment App Services with special reference to Pune City”, to study the customer’s satisfaction level of E-payment App. The data have been composed through issuing questionnaire to 200 respondents by espousing convenient sampling technique. Simple Percentage Method has been used to analyse the data. The result of the study reveals that the Majority of the respondents are using PAYTM App Services and they feel it is comfortable and satisfied with speed of transactions.

**Ahuja & Joshi (2018)** have deliberated about the customer perception regarding mobile wallets. In this study they examined that the features exploration practice is used to categorize the factors which influence customer opinion towards Mobile wallets. The study has been conducted about the diverse types of mobile wallets in India. The data is collected

from both secondary data and primary data. The survey was conducted among 139 mobile respondents in the telecommunication industry.

**Rana (2017)**, carried out a research entitled “Study of Consumer Perception of Digital Payment Mode” with a view to know the customer perception and impact of demographic factors on adoption of digital mode of payment. Interview method has been used to collect data from 150 respondents in Delhi. Simple Percentage and ANOVA have been used to analyse the data. The study finds that majority of respondent are male belong to the age group between 20 and 30 years and majority of them are graduates employed in private sector and they are influenced by brand, convenient use, protected transactions, saves time. The outcome of ANOVA indicates that education play a significant role in acceptance of digital payment mode.

**Abhijit and Harmeet (2017)** studies about the G-Pay usage by smartphone users and also attempts to analyse the varied hindrances faced by the G-Pay users. A structured questionnaire was distributed to 230 smartphone users but only 151 responses were valid and thought of for data analysis. The researchers have used the evocative method so as to urge the statistical results. The findings conclude that G-Pay has got to work upon the payment gateway to enhance the transaction efficiently and to figure upon transaction time, discounts and offers.

**Singh & Gupta (2016)** They have piloted a study to identify various factors influence on the adoption of mobile wallet payment among customers They considered the various variables for the study are Convenience, Trust, Security, and Adaptability which have an impact on the satisfaction of mobile wallet usage. The study was conducted in the Kurali city, District of Punjab. Pearson’s correlation Analysis was to inspect the relationship between the different basic variables of the study. The study findings show that mobile wallets are measured as the futures of cash.

**RameshSardar (2016)** in his study, “Preference towards mobile wallets among the urban population of Jalgaon City” makes an attempt to examine the preference towards mobile wallets among the urban population of Jalgaon city and effectively analysed the impact of demographic variables on the usage of Mobile wallets. The study reveals that instant payment is the important factor to opt for Mobile payments.

**Rathore (2016)** stated that digital payment using wallet was exceedingly fitting for consumers in purchasing products and services through online without physical travels across places.

**Pawan Kalyani (2016)** found that Digital wallets which are prevalent and associate to the online business company are more popular and those with the banks are doing fine, mobile companies' e-wallet is restricted to the mobile users. People are using a few services mostly for recharging the DTH and paying bills, Shopping etc. The awareness and practical efficacy of the e-wallet is low, that should be increased by adding more value added services to it.

**Liu & Tai (2016)** they have conducted a study in Vietnam to analyse the factors influencing the consumer's intention to use mobile payment services. The variables considered for the study to determine consumer's intention to custom of mobile payment services are flexibility, mobile payment familiarity, convenience, compatibility, ease of use, usefulness, risk, trust, and safety. The two variables namely perceived ease to use and perceived usefulness was pull out from the TAM model which was deemed as a suitable model to study consumers' response and behavior when a new product is introduced. The study concluded that in Vietnam young people have greater intention to use mobile payment services when equated to older people and most of the consumers are not giving much importance to risk.

**Cabanillas et.al., (2015)** they have developed a model to examine user's intention to use mobile payment based on TAM and MPTAM (Mobile Payments Technology Acceptance Model). The study was investigated the moderator effect of the user's age between the subjective rules and the facility of use. The survey has been conducted among the 2012 national panel of internet user (physical & virtual). The analysis of data shows that an internet user's behavior is influenced by their intention to use new tools. The study discoveries show that most of the younger mobile payment users are pleased and accepted the mobile technology tools when compared to older mobile users. This study has indicated that older consumers are the tougher relationship between facility to use and subjective rules. So the mobile technology provider should give more attention to older consumers to create knowledge about usable of new tools.

**Meuthia (2015)** the study has been investigated that empirically the experiences of users' satisfaction on e-money adoption in Indonesia. In this study the trust was considered as an important factor for e-money adopt, and at the time of promotes the system quality and participation. The data was collected from 117 e-money respondents in Indonesia. The result

shows that users' satisfaction is resolute based on system quality and participation of users. The research proposed that trust factors have high level followed by the others stimulants variables. The study established that faith and suspicion were strongly influenced the level of users' satisfaction on e-money adoption in Indonesia.

**Vidyashree DV, Yamuna N, Nithya Shree G (2015)** concluded that Public are more mindful about the online payments through mobile applications and there is a wider increase in growth rate. Paytm and Pay u Money is giving 2 level security authentication to safeguard our payment details. The digital payment system has to take essential steps to overcome delay in dispensation of payments.

**Doan (2014)** he conducted a study to understand consumer adoption on mobile wallets in Finland area. This research was deliberated in a quantitative method using questionnaire which was sent to potential respondents in Finland. The study measures the market circumstance of mobile wallets users. The study findings reveal that the usage of mobile wallet is only in the initial stage and respondents are showing positive attitudes towards usage of mobile wallets. Research concluded that the trust factor discloses the positive or negative impact on adoption of user, depending on the user satisfaction and user's situation.

**Govender & Sihlali (2014)** they explored the factors determine the adoption of mobile banking (m-Banking) services among students who are more technically knowledgeable. The questionnaire is prepared based on the qualitative approach. Based on the extension of the Technology Acceptance model, the theoretical framework is developed to probe the factors that determine student's acceptance of mobile banking. The constructs of TAM for mobile adoption such as Perceived Ease of Use, Perceived usefulness, Perceived Value, Trust Intention to Use, and Usage Behavior were used. The statistical tool multiple regression analysis was used to examine the influence of independent variables on the dependent variable of target to use m-banking. The independent variables trust, perceived value, perceived ease of use and social influence may account for 42percent on the influence of dependent variable.

## **RESEARCH METHODOLOGY**

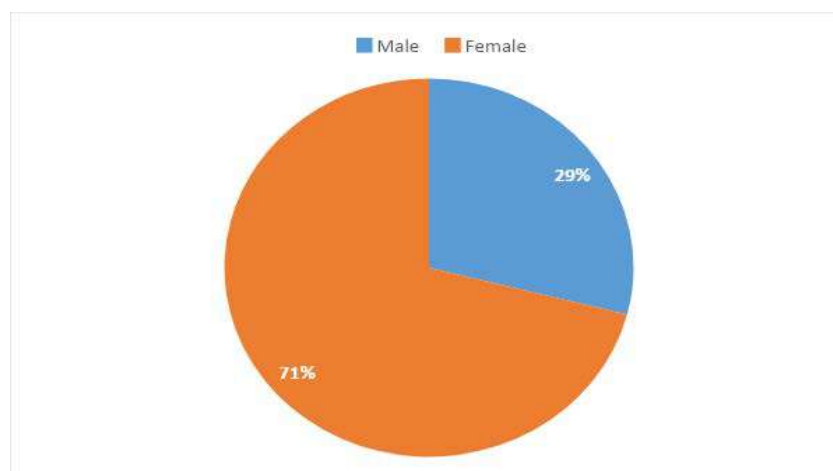
The study is analytical and descriptive in nature hence primary data was collected through the survey method. Secondary data was collected from various sources like websites, articles,

research projects etc. The survey is confined to the Chalakudy area and the sampling technique used was convenience sampling. The sample includes 100 respondents. The data for the study was collected through a structured questionnaire. Statistical tools such as tables, charts are being used for data presentation. Data was analysed using SPSS. One-Way ANOVA is the statistical test carried out in this study. Percentage analysis was also made to arrive at implications.

## RESULTS AND DISCUSSION

**Table 1 Showing gender wise classification**

Particulars	No. of respondents	Percentage
Male	29	29%
Female	71	71%
Total	100	100%

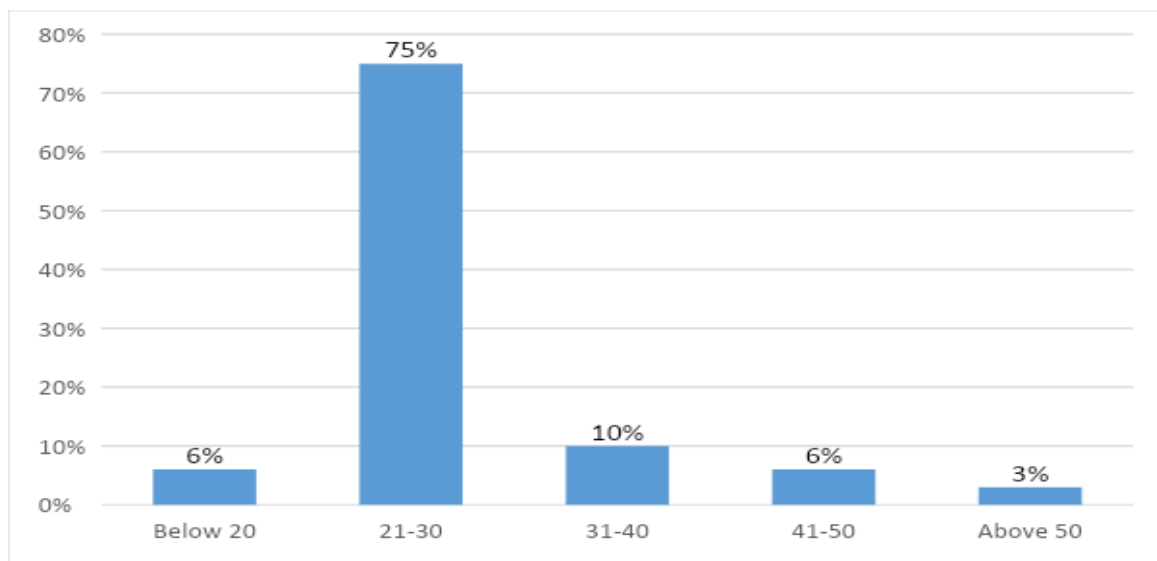


**Figure 1 showing Gender wise classification**



**Table 2 Showing age wise classification**

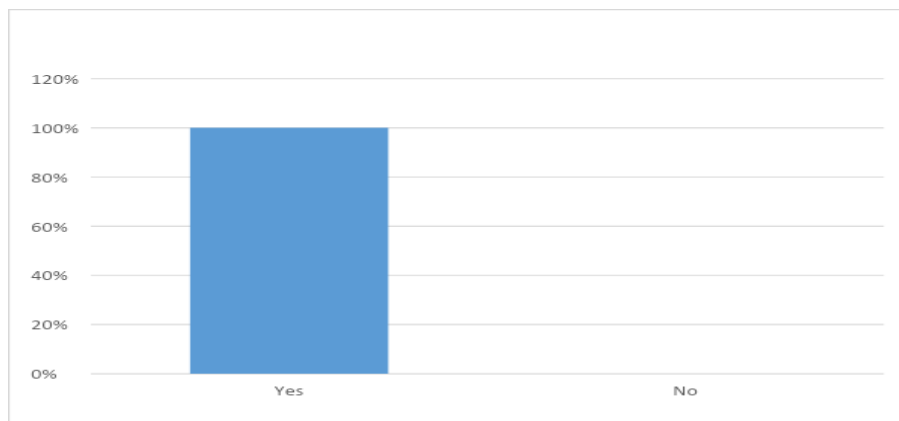
Particulars	Frequency	Percentage
Below 20	6	6%
21-30	75	75%
31-40	10	10%
41-50	6	6%
Above 50	3	3%
Total	100	100%



**Figure 2 showing age wise classification**

**Table 3 Showing no. of users of Google pay**

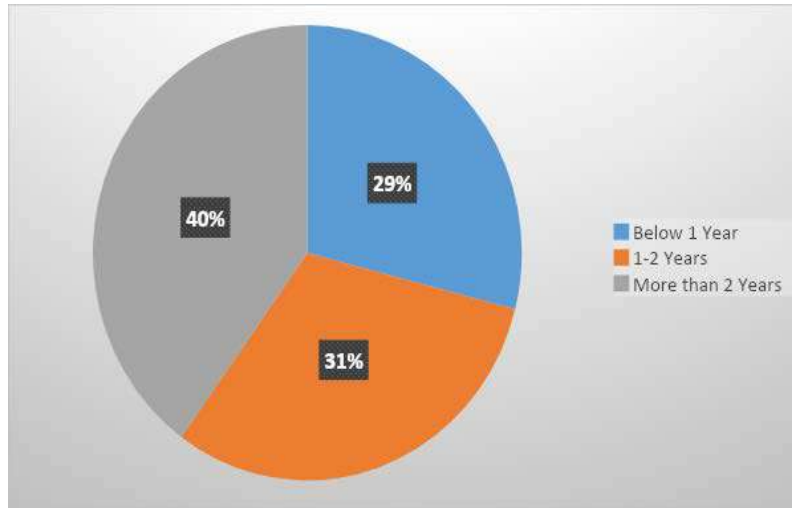
Particulars	Frequency	Percentage
Yes	100	100%
No	0	0%
Total	100	100%



**Figure 3 Showing no. of users of Google pay**

**Table 4 Showing how long respondents have been using Google pay**

Particulars	Frequency	Percentage
Below 1 Year	29	29%
1-2 Years	31	31%
More than 2 Years	40	40%
Total	100	100%



**Figure 4 showing how long respondents have been using Google pay**

**Table 5 Showing respondent's level of awareness towards Google pay facilities**

Parameter	1-Not aware	2-Slightly aware	3-Moderately aware	4-Very aware	5-Extremely aware
Bank Transfer	10	19	20	26	25
Pay contacts	7	19	16	29	29
Daily limit Rs.100000	17	23	32	16	12
Mobile recharge	8	13	19	27	33
View account balance	11	10	19	26	34

### **Hypothesis Testing**

H0: There is no significant difference between age and awareness level of customers towards Google pay.

H1: There is significant difference between age and awareness level of customers towards Google pay.

## One Way ANOVA test using Age and Awareness Level of Respondents

### ANOVA

Age of the respondents

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	50.662	18	2.815	22.599	.000
Within Groups	10.088	81	.125		
Total	60.750	99			

**Interpretation:** The above table showing the value as per one way Anova test is 0.000, it is less than 0.05 level of significant. So accept H1. There is significant difference between age and awareness level of customers towards Google pay.

### LIMITATIONS

The study was confined to Chalakudy town only and therefore the findings of the study cannot be extended to other areas. Time and cost are other factors limiting the study to a sample of 100 respondents.

### FINDINGS

- Majority (71%) of the Google pay users are females than males.
- 75% of youth members (age 21-30) use Google pay more while compared to other age groups.
- Majority (64%) of the respondents are students who use Google pay more than others.
- All the 100 respondents are users of Google pay.

- 40% of the respondents have been using Google pay for more than 2 years.
- Ease of use is the main reason for the respondents to prefer Google pay.
- 76% of respondents agree that Google pay is accepted everywhere.
- Bank transfer, bill payment, mobile recharge are the most preferred usage of Google pay.
- Majority of the respondents are extremely aware of the facilities provided by Google pay.
- Majority (91%) of the respondents agrees that Google Pay is safe to use.
- 48% of the respondents agree that Google pay is less risky and gives you high security on your bank data.
- Server issues are the major problem faced by Google pay users.
- 55% of the respondents rate their internet connection as Good.
- 63% of the respondents agree that Google pay is highly convenient based on ease of operation.
- Majority (66%) of the respondents are satisfied with the payment experience on G-Pay.
- Ease of use, time saving and convenience are the main motivational factors that influence users to use Google pay.
- Majority of the respondents probably will recommend their friends and family to use Google pay for making payments.
- There is a significant difference between age and awareness level of customers towards google pay.

## CONCLUSION

The present world cash is no longer becoming a means of transaction. The world needs to move from the cash-based towards a cashless (digital) payment system. The study was accomplished to explore consumers' perception, awareness and willingness to engage in using a Google pay to replace the content of their physical wallets. With the amplified aggression of internet connectivity Google pay has steered to an increase in the number of Google pay users. Transactions using Google pay are sheltered as Google keeps all payment information on secure servers. User's full card details are never stored on their phone or shared with merchants when they use Google pay. The handiness and ease of use has gained credit to mobile wallets. And it can be concluded that there will be a tremendous growth in adoption of Google pay in the forthcoming years.

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## **A STUDY ON CONSUMER BUYING BEHAVIOUR TOWARDS FINANCIAL PRODUCTS.**

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### **ABSTRACT**

Consumer is the king of the market. The needs and wants of the consumers are unlimited. Buying behaviour is the process by which the consumer makes the choice of action out of his interest. The purchasing power of the consumers plays the very important role in buying aspect. The modern era is linked with the technology and the consumer's gets information about the products at the figure tips. There are various factors which influence the consumers in buying the products such as Psychological, Social, Cultural, Personal, and Economic factors. The study aims to identify the effect of these factors in decision making selection of financial products. The consumer awareness about the available financial products and the financial Literacy about the same also pay the way for effective selection of the financial products. The last step in the buying behaviour is the satisfaction derived out of the financial products and the attitude of consumers to purchase gain in the near future. The Pandemic has effected all the sectors of the economy. The results of the pandemic can be seen in the financial markets also. The population of the study is from Ernakulum District. The questionnaire is being used for collecting primary data and analysed with the help of SPSS. Convenience sampling method is adopted for data collection. The study shows that Fixed deposit are the choice by majority of the respondents. Testing of hypothesis proves that there exists a positive relationship between motivational, social and economic factors on consumer buying behaviour. The statistical result



reports the multiple regression analysis, here we can see that, since,  $p < 0.01$ , this model is significant and the R square ( $R^2$ ) is the proportion of the variance in the Consumer buying behaviour scores accounted for, by economic, social, motivational factors and risk perception.

***Key Words: Consumer Buying Behaviour, Factors, Risk Perception, Financial Products.***

## **INTRODUCTION**

India is called as the country of savers even though spending is on the rise. The Statistics shows that disposable income is increasing. India is the world's second largest consumer market. Consumer behaviour refers to how the people spent their resources like time, money and effort in purchasing the products. The value of the money is the important factor in the buying behaviour of the consumers. Consumer buying behaviour is the lengthy process where the consumer must identify the products available in the market identify the features, quality and also examine the drawbacks before making the buying decisions. Talking about the financial industry the India has a broad financial industry which is growing due to the expansion of various new financial players. Due to the rapid change in technology and fashion, humans are keener to acquire the latest products. In doing so, they may run out of money. In such situations, people tend to get the help of financial or non-financial institutions to fulfil their desire. More over these institutions provide lucrative offers of lower interest rate, doorstep services, no requirement of guarantor, etc. which will attract more consumers in choosing monthly instalments as a way to repay the outstanding amount for the products they purchase. Even though there is a great growth, competitiveness and wide variety of choices in this area, a greater number of consumers are both directly and indirectly get exploited under various circumstances.

## **STATEMENT OF THE PROBLEM**

Consumer buying behaviour always exhibits the fluctuation behaviour. As the human beings always wish to adapt to the existing changes taking place in the economy. Today the consumer can attain information about the products by just searching on the internet. Financial products are of the major aspect of investment for the consumers. In the present world, consumers have no end in their desire to purchase products. Indian government has number of reforms to encourage the financial markets and financial products. Consumers are of two types one is aggressive and other is conservative. Aggressive consumer is ready to see everything in new

phenomenon, ready to try new innovations in the market. Conservative consumers are safe players they are very slow in testing the new products. They are not ready to take risk. For a consumer they are various factors such as internal and external involved in purchasing the products. Financial perceived risk arises when the consumer thinks about their Return on Investment. Assessing whether the product they intend to purchase is worth its price and whether the benefits of the products outweigh the investment they make come under Financial perceived risk. Risk perception is defined as the possibility of consumers' subjective feelings of various losses in purchasing goods. In this investigation, the relationship between risk perception and customer purchase behaviour is addressed. Thus, the study tends to know the financial products preferred by the consumers and to analyze the influence of independent variables such as economic factors, motivational factors, social factors and mediating effect of risk perception on the consumer buying behaviour.

## **OBJECTIVES OF THE STUDY**

1. To know the financial products preferred by the consumers.
2. To analyze the influence of independent variables such as economic factors, motivational factors, social factors and mediating effect of risk perception on the consumer buying behaviour.

## **SIGNIFICANCE OF THE STUDY**

Consumers are getting wide variety of choices for buying the products. As the financial markets and instruments are the back bone of any country. The study is significance in the present scenario to identify the various factors influencing purchase behaviour towards financial products.

## **SCOPE OF THE STUDY**

The study is limited to Ernakulum District. The area of the study includes the various economic, social and motivational factors influencing the consumer buying behaviour.

## **REVIEW OF LITERATURE**

**Tasmin Jahan & Md. MahiuddinSabbir (2018)** The goal of this article is to look into the elements that influence a customer's decision to buy life insurance. This study is mostly

descriptive in nature and used both primary and secondary sources of data. It is based on a sample of 200 people. ANOVA tests, correlations, and multiple regression analyses were all used in the research to examine the relationship between dependent and independent variables. This study shows that, with the exception of occupation, socio-demographic factors have no influence on life insurance purchase intentions. The survey also showed that the two factors most strongly influencing customer desire to acquire life insurance were bequest motivation and financial knowledge. However, it was discovered that customers' interest in or desire to buy life insurance was unaffected by the precautionary motive.

**Dr. Rajeshwary G & Mohammad Aslam Mohammad Hussain (2017)** Research on consumer behaviour helps predictions and understanding of the subject of purchases as well as the motivations and frequency of purchases. Consumer purchasing behaviour for financial services in Mumbai is influenced by a number of variables, including the nature of financial services, the standard of living of Mumbai residents, e-marketing, growing competition, rising educational levels in Mumbai, etc. In order to understand the elements that affect consumers' purchasing decisions and to learn how to keep them as customers, the study of consumer behaviour is crucial in the financial services sector. Therefore, this essay aims to investigate the variables affecting consumer behaviour for various financial services.

**Vidha Pradhan (2016)** The study aims to investigate some of the variables influencing shoppers' impulsive purchasing decisions in supermarkets. Additionally, it seeks to confirm how these elements and impulsive purchasing behaviour are related. A primary study is conducted among consumers who frequent the Kathmandu valley's supermarkets. A systematic questionnaire is utilised to gather information from the 200 respondents in the sample. By convenience and quota sampling, the sample is selected based on age. The results imply that the majority of grocery shoppers make impulsive purchases. The majority of the respondents don't make any preparations before going to the grocery store. Instead, they browse the aisles and products and purchase what they see necessary. The majority of those surveyed buy specific goods like groceries, accessories, and personal care products.

**K Vidyakala, SAS Nakhala Devi and G Iswarya Rani (2015)** Purchasing behaviour can be roughly categorised as the choices and deeds that affect a consumer's purchasing behaviour. The method through which a consumer tends to meet his or her wants by making selections is known as buying behaviour. Deregulation and the development of new technologies have sparked intense market competition, which has a significant effect on consumer behaviour. The

factors influencing the purchasing behaviour of financial instruments are discussed in the study. In the Trichy District, the study involved 120 participants from various demographic categories. The findings show that the primary variable influencing investors' purchasing decisions is customer happiness

## **RESEARCH METHODOLOGY**

Type of Research Design: Descriptive Research Design  
Population: Ernakulum District

Sample Size: 100

Sampling Method: Convenience Sampling Method  
Type of Data: Primary Data and secondary data  
Method for collecting Data: Questionnaire

Tools for analysis: SPSS

Variables Identified: Economic Factors, Social Factors, Motivational Factors, Risk Perception and Consumer buying behaviour.

### **Hypothesis of the Study**

**H1:** There is significant relationship between economic factors and Consumer buying behaviour.

**H2:** There is significant relationship between social factors and Consumer buying behaviour.

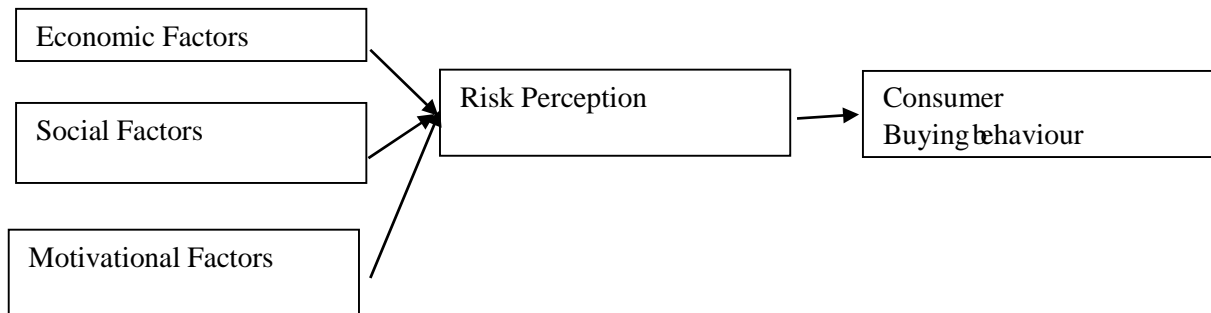
**H3:** There is significant relationship between motivational factors and Consumer buying behaviour.

**H4:** Risk perception mediates the relationship between independent variables such as economic factors, motivational factors, social factors and consumer buying behaviour.

## **LIMITATIONS OF THE STUDY**

- i. Among various influencing factors towards consumer buying behaviour, the study focused only the motivational, economic and social factors.
- ii. The study is limited to financial products only

## Conceptual Model



## RESULTS AND DISCUSSIONS

Variables	Category	No of Respondents	Percentage
Gender	Male	64	64
	Female	36	36
Age (in years)	Below 30 years	21	21
	31-40 years	34	34
	41-50	45	45
Educational qualifications	Graduate	24	24
	Post graduate	76	76
Annual income	Less than 300000	35	35
	300000-500000	36	36
	Above 500000	29	29
Occupation	Business	19	19
	Profession	27	27
	Salaried	54	54
Source of investment information	Financial advisor/brokers	54	54
	Internet	16	16
	Media	15	15
	Friends/ colleagues	10	10
	Family	5	5
Factors affecting Selection	Risk	27	27
	Convenience	12	12
	Tax benefit	17	17
Most Preferred Financial Products	Return	44	44
	Bank deposit	38	38
	Derivatives Market	10	10
	Commodity market	8	8
	Mutual fund	31	31
	Equity Shares	10	10

(Source: Primary Data)

**H1:** There is significant relationship between economic factors and Consumer buyingbehaviour.

**H2:** There is significant relationship between social factors and Consumer buyingbehaviour.

**H3:** There is significant relationship between motivational factors and Consumerbuying behaviour.

**Table 1 Correlation between Economic factors, social factors, motivational factors andconsumer buying behaviour.**

<b>Independent variables</b>	<b>Dependent Variable</b>	<b>Pearson Correlation</b>	<b>Sig. (2-tailed)</b>	<b>N</b>
Economic Factors	Consumer Buying Behaviour	.701**	.000	100
Social Factors		.671**	.000	100
Motivational Factors		.532**	.000	100

**\*\*.** *Correlation is significant at the 0.01 level (2-tailed).*

From the above statistical results, it is inferred that Economic factors (.701\*\*), Social Factors (.671\*\*), Motivational Factors (.532\*\*), and consumer buying behaviour are positively correlated each other. It indicates the extent to which two variables are linearly correlated. The probability value associated with the correlation is less than 0.01. It indicates that there is a positive relationship Economic factors, social factors, motivational factors and consumer buying behaviour. Hence, the hypothesis formulated for the study, are accepted.

H4: Risk perception mediates the relationship between independent variables such as economic factors, motivational factors, social factors and consumer buying behaviour.

Multiple Regression Analysis results for Economic Factors and Risk Perception with Consumer Buying Behaviour

Variables	Beta value ( $\beta$ )	Sig	R <sup>2</sup>	Adjusted R <sup>2</sup>	Collinearity Statistics		Durbin Watson
					Tolerance	VIF	
Economic Factors							
	0.155	0.000	0.516	0.512	0.658	1.522	1.914
Risk Perception	0.576	0.000			0.658	1.522	

*Dependent Variable: Consumer Buying Behaviour*

The statistical result reports the multiple regression analysis, here we can see that, since,  $p < 0.01$ , this model is significant and the R square ( $R^2$ ) is the proportion of the variance in the Consumer buying behaviour scores accounted for, by Economic factors and risk perception.

Multiple Regression Analysis results for Social Factors and Risk Perception with Consumer Buying Behaviour

Variables	Beta value ( $\beta$ )	Sig	R <sup>2</sup>	Adjusted R <sup>2</sup>	Collinearity Statistics		Durbin Watson
					Tolerance	VIF	
Social Factors	0.145	0.000	0.501	0.511	0.644	1.501	1.901
Risk Perception	0.556	0.000			0.644	1.501	

*Dependent Variable: Consumer Buying Behaviour*

The statistical result reports the multiple regression analysis, here we can see that, since,  $p < 0.01$ , this model is significant and the R square ( $R^2$ ) is the proportion of the variance in the Consumer buying behaviour scores accounted for, by social factors and risk perception

Multiple Regression Analysis results for Motivational Factors and Risk Perception with Consumer Buying Behaviour

Variables	Beta value (β)	Sig	R <sup>2</sup>	Adjusted R <sup>2</sup>	Collinearity Statistics		Durbin Watson
					Tolerance	VIF	
Motivational Factors	0.152	0.000	0.512	0.503	0.644	1.511	1.931
Risk Perception	0.556	0.000			0.644	1.511	

*Dependent Variable: Consumer Buying Behaviour*

The statistical result reports the multiple regression analysis, here we can see that, since,  $p < 0.01$ , this model is significant and the R square ( $R^2$ ) is the proportion of the variance in the Consumer buying behaviour scores accounted for, by motivational factors and risk perception

## FINDINGS

Majority of the respondents are males with the age more than 40 years, Most the respondents are post graduates, income of the respondents belongs to salaried class with the annual income range from 3 Lakhs to 5 Lakhs. Most of the respondents seeks advisors from financial brokers and agents, the returns are considered to be the main the objectives of the purchase, Majority of the investors seeks information regarding the purchase of the products from financial brokers. Fixed deposit are the choice by majority of the respondents. Testing of hypothesis proves that there exists a positive relationship between motivational, social and economic factors on consumer buying behaviour. The statistical result reports the multiple regression analysis, here we can see that, since,  $p < 0.01$ , this model is significant and the R square ( $R^2$ ) is the proportion of the variance in the Consumer buying behaviour scores accounted for, by economic, social, motivational factors and risk perception.



## CONCLUSION

The modern era is linked with the technology and the consumer's gets information about the products at the figure tips. There are various factors which influence the consumers in buying the products such as Psychological, Social, Cultural, Personal, and Economic factors. The study aims to identify the effect of these factors in decision making selection of financial products. The consumer awareness about the available financial products and the financial Literacy about the same also pay the way for effective selection of the financial products. Fixed deposit are the choice by majority of the respondents. The risk perception also mediates the relationship between economic, social and motivational factors on consumer buying behaviour.

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**A STUDY ON CONSUMER PERCEPTION TOWARDS THE  
EMERGENCE OF OTT MEDIA SERVICES IN FILM INDUSTRY  
DURING COVID-19 PANDEMIC WITH SPECIAL REFERENCE TO  
ANGAMALY MUNICIPALITY**

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**ABSTRACT**

Over- The – Top media service is said to be a streaming service offered directly through internet which attracts the viewers' mind easily. OTT replaces cable, satellite television etc that was traditionally the main controller or distributor of such contents. Therefore, this might avoid monopolistic competition. This term is very synonymous with Subscription-Based Video-on-Demand (SVoD) services which offer access to film and television content .This includes existing series acquired from other producers and even original content produced specifically for the different services.

**Keywords:**

**OTT Platforms, Smart TV platforms, digital marketing**

## INTRODUCTION

India is having a well established reputation for its film industry and it continues to be the world's largest producer of films. There is always a consumer demand or domestic demand for films which appears in various platforms in various developed countries. In this prevailing condition, 183 billion Indian film industry is going through its worst phase due to the lockdown necessitated by the corona virus pandemic. While the impact of the lockdown on the industry at large is still being evaluated, we take a look at how film production and related fields have suffered in India over the past month. It eventually led to an increase in OTT platforms such as Amazon prime, Netflix, Disney+Hotstar etc. This demonstrate how the film market can continue to have a significant positive impact on the Indian economy.

This study mainly aims to unleash the veil of the perception of the consumers towards the OTT media services in film industry during Covid -19 pandemic with special reference to Angamaly Municipality

**Influence of OTT:** OTT is responsible for disrupting conventional cable and satellite television systems through Internet distribution of television and film content. The days of conventional television channel bundling with extra deals and equivalent bills have now gone because viewers no longer have to subscribe to cable or satellite networks and pay a big bill every month to be able to view their favorite movies or television shows. An OTT network offers an application-based service that directly delivers content to the user's computer via conventional channels of content delivery and is commonly referred to by a common man as online Television. OTT channels are increasingly being used in the delivery of media and networking services related to the distribution of television and film content, as live streaming and video-on - demand technologies are proving much more cost-effective for the ultimate consumer than conventional cable and satellite networks.

The usage of OTT services is the highest among the younger age group primarily due to the ease and versatility of watching TV and movie content through various devices of their choice, something that is not possible with cable and satellite channels. For an increasing number of broadband solutions and in effect, broadband subscribers

## **OBJECTIVES OF THE STUDY**

1. To study in detail the emerging role of digital marketing through OTT platform.
2. To evaluate the usage rate of OTT application
3. To compare and contrast the pre-covid and the ongoing covid scenario with respect to film industry.

## **STATEMENT OF THE PROBLEM**

The OTT has really disrupted our country's entertainment sector. It has been more comfortable, accessible and affordable for the large segment of the consumers. Anybody with a mobile phone and internet connection can sit anywhere in this world and catch-up with the latest technology. As the lights are going out on shoots, movie premiers and certain live events, we must say that the only silver lining amidst all these is the advancement and the popularity of the OTT media service. There is always a very high degree of demand for high-quality contents which is increasing day by day from the common people. Therefore, this study attempts to analyze the impacts of perception of the customers towards emergence of OTT media service in film industry during Covid-19 pandemic with respect to Angamaly Municipality

## **SIGNIFICANCE OF THE STUDY**

OTT platform has played a significant role in the modern times. The significance of the study is to provide a better understanding on the emergence of OTT media service in film industry during Covid-19 pandemic. This study portrays the changing pattern of the viewers demand after the emergence of OTT platforms, its usage rate etc. These platforms provide an outstanding TV experience that brings delight to their customers. This reduces the churn and creates a loyal customer with various facility of personalization, robust searching, frequent content refreshing which helps us to succeed with the upcoming technologies.

## **SCOPE OF THE STUDY**

There is an emerging global trend in the growth of OTT media services which makes significant changes in the growth trend as well as various business initiatives at a national level. The shifting consumer behavior and the new business modes reshape the industry into a much better way than today. With the analysis of the difference between the pre-covid and

the ongoing situation, the study may unveil the reality about some myths and the facts surrounding OTT industry.

## **METHODOLOGY**

### 1. Population :

The population for the study is limited to OTT users in Angamaly Municipality

### 2. Sample size:

The sample size for this research is 100

### 3. Sampling technique:

The technique used for sampling in this research is random sampling

### 4. Collection of data:

Primary data are collected through survey by using questionnaires.

Secondary data are collected from books, journals, websites, articles etc.

## **REVIEW OF LITERATURE:**

**Chandwani.2020** - any endeavors to force extra guidelines on OTTs may smother development, as the different Internet administration and substance organizations are various and quick changing, contrasted with administrative systems that are delayed to respond and adjust, and that can stay static even with fast innovations.

**Anantho. n.d.-** Today Thailand is presently experiencing advanced TV change. While there is an open door for future development in OTT administrations in Thailand, a few imperatives must be considered, for example, the enlistment of specialist co-ops, the extent of unfamiliar possession, the issue of protected innovation, internet fairness, and the control of a substance. File Terms - OTT in Thailand, Over-the-Top, real-time recordings

**Gupta. 2020-** Times Internet has long-standing publicizing associations with driving OTT (Over the Top) players, otherwise called real-time media administrations. The brand's most recent whitepaper unites learnings from essential exploration and knowledge examines done

among 2000 Times Internet clients to see how crowds associate with and expand content on OTT stages. The report features the adaptability of timing, the scope of shows, and new substance that rose as the key purposes behind watching content on OTT stages

**Craig. 2020-** OTT substance can be downloaded legitimately and seen by clients, on request, employing the web on any associated gadgets like savvy TVs, PCs, tablets, cell phones, and gaming reassures. All OTT administrations are not liberated from cost and expect clients to buy into a specific OTT stage by paying month to month or yearly membership expenses

**Shrivastava.2020-** Less costly and competitive information costs have allowed rustic and urban populations to invest in alarmingly high video content alongside a strong network. Over-the-top or OTT phases provide a range of online substance classifications. Netflix, Amazon Prime, and ALT Balaji are some regular OTTs among the Indians.

**Park, S., & Kwon, Y. (2019)** -In their paper “ Research on the Relationship between the Growth of OTT Service Market and the Change in the Structure of the Pay-TV Market” identified that OTT Platforms like Netflix, Amazon Prime and Hulu are revamping the competition among the various firms indulged in the broadcasting industry. The paper witnesses the emergence of OTT Platforms as a ‘**disruptive innovation**’.

**Dikshit (2016)** saw that multi-stage content delivery platforms have made new financial chances and favorable circumstances for content suppliers, yet it is additionally a twofold edged blade, since any help inadequacy will have consequences. Despite poor Web network and questionable power matrices, Indian telecasters have gotten up to speed with the new pattern of multi-stage content-conveyance through development.

## DATA ANALYSIS AND INTERPRETATION:

**Table. 1 Distribution of Samples**

S. No.	Category	Subgroups	%	Total
1.	Gender	Female	54	100
		Male	46	
2.	Age	Less than 18	4	100
		19 - 25	82	
		26 - 35	6	
		36 and above	8	
3.	Occupation	Students	66	100
		Business	8	
		Private employee	24	
		Government employee	2	
4.	Gadgets	TV	10	100
		Mobile phones/Tablets	73	
		Laptop	16	
		Projector	1	
5.	Digital Marketing Platform	Facebook/Instagram	37	100
		Youtube	17	
		Others	31	
		Google	15	
6.	Payment option used	Credit card	10	100
		Debit card	45	
		UPI	30	
		Bank Transfer	15	
7	Rating According to Usage	Amazon Prime video	30	
		Netflix	36	
		Voot	4	
		Disney+Hotstar	12	
		Sun NXT	3	
		Zee 5	2	
		Sony Liv	4	
MX Player TV	9			

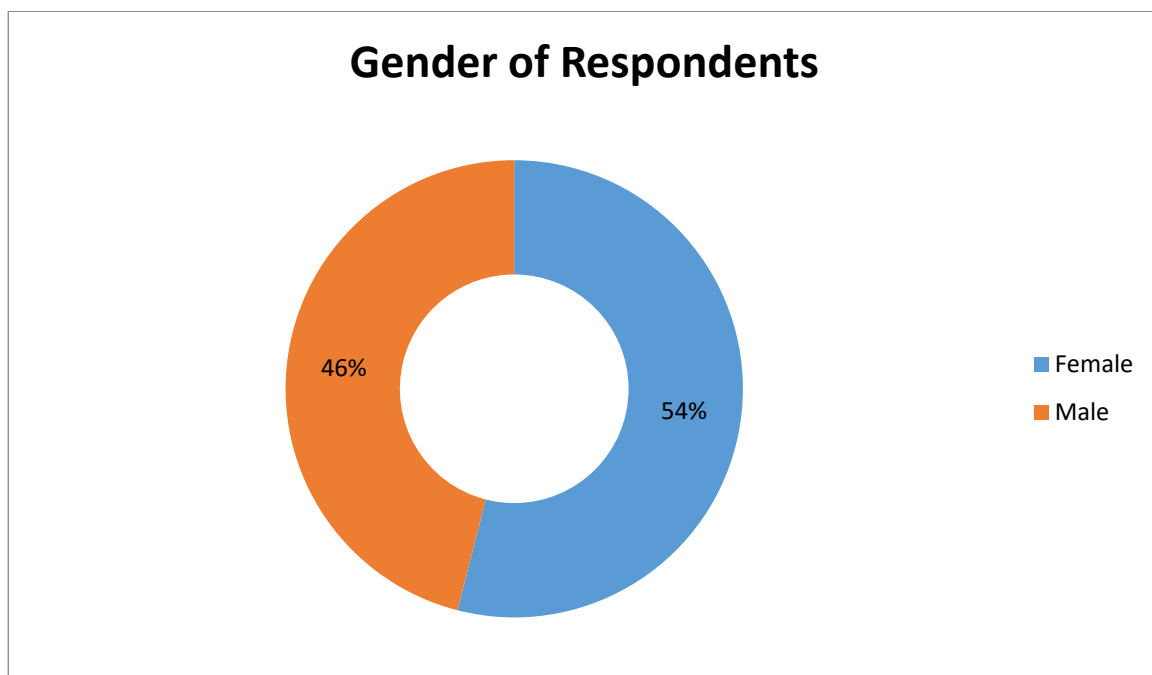


## 1. Gender of the Respondents:

**Table No. 4.1 showing the gender of the respondents**

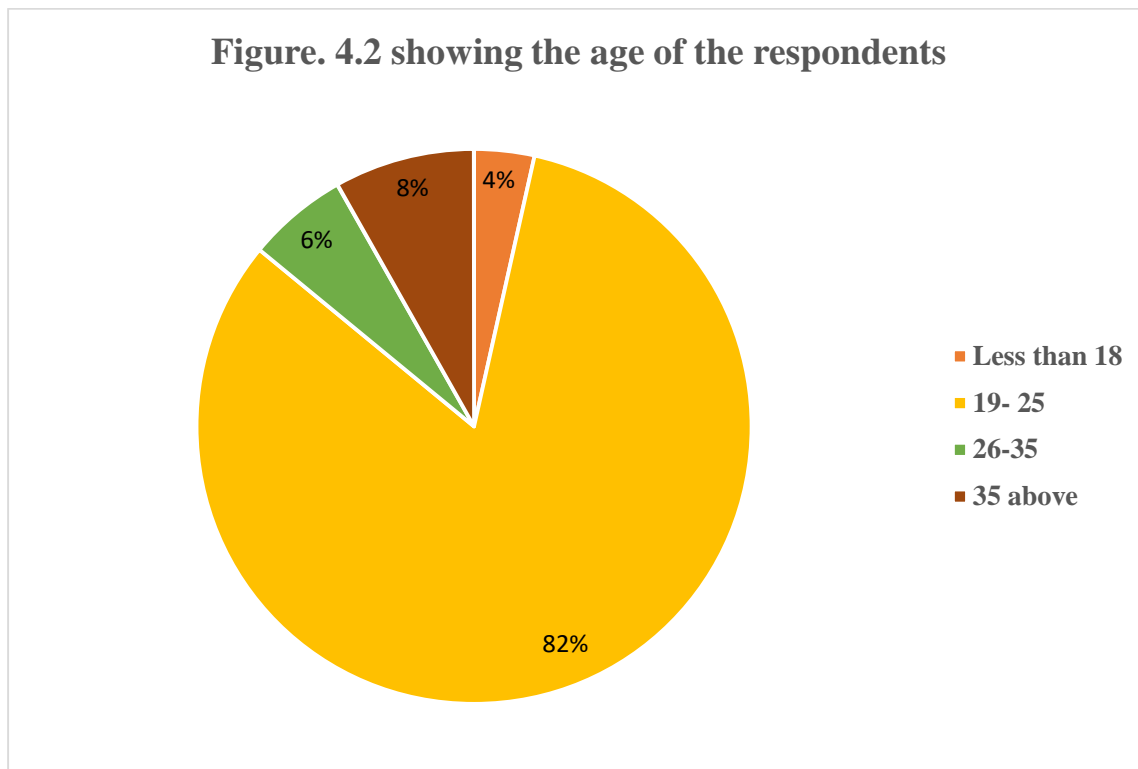
Particulars	Frequency	Percentage
Male	46	46
Female	54	54
Prefer not to say	0	0
Total	<b>100</b>	100

**Figure No.4.1 showing the gender of the respondents**



## 2. Age of the respondents:

Table No. 4.2 showing the age of the respondents		
Particulars	Frequency	Percentage
Less than 18	4	4%
19- 25	82	82%
26-35	6	6%
35 above	8	8%
Total	<b>100</b>	100%

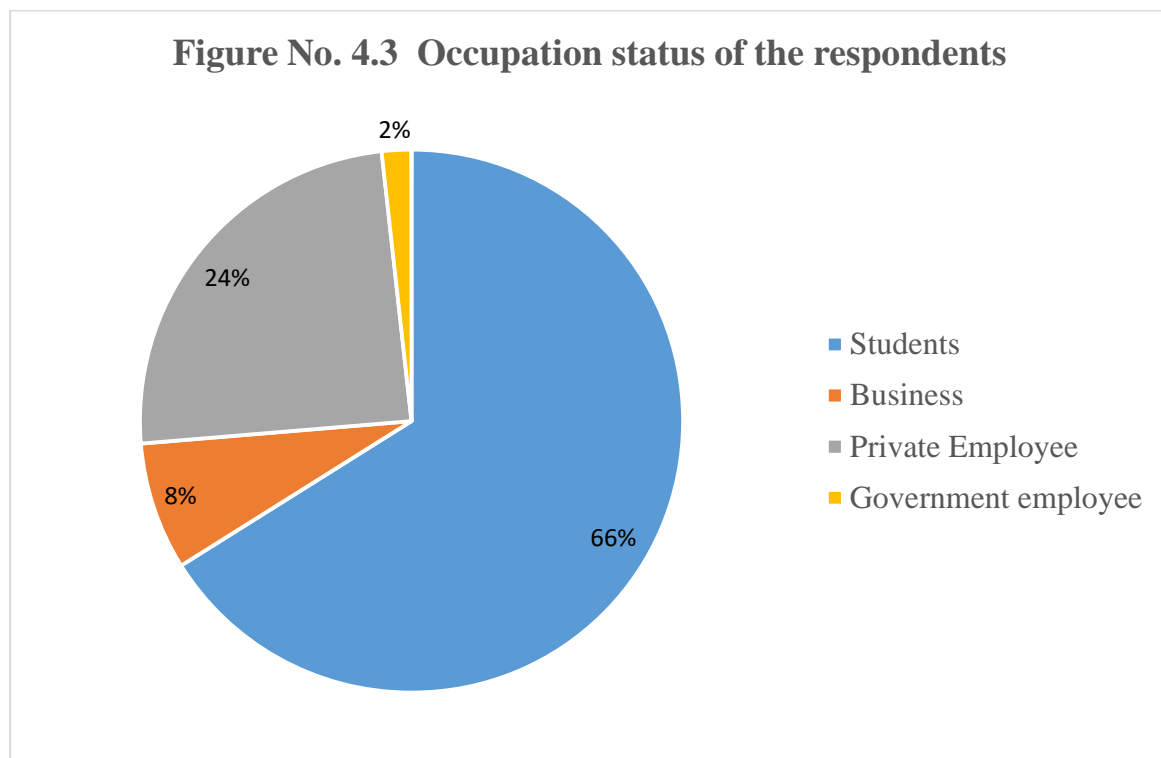


### Inference:

4 respondents are under the age of 18, 82 respondents are in the age group of 19-25, 6 respondents are in the age group of 26-35 and 8 respondents are older than 35.

### 3. Occupation status of the Respondents

Table No. 4.3 showing the occupation status of the respondents		
Particulars	Frequency	Percentage
Students	66	66%
Business	8	8%
Private Employee	24	24%
Government employee	2	2%
Total	<b>100</b>	100%



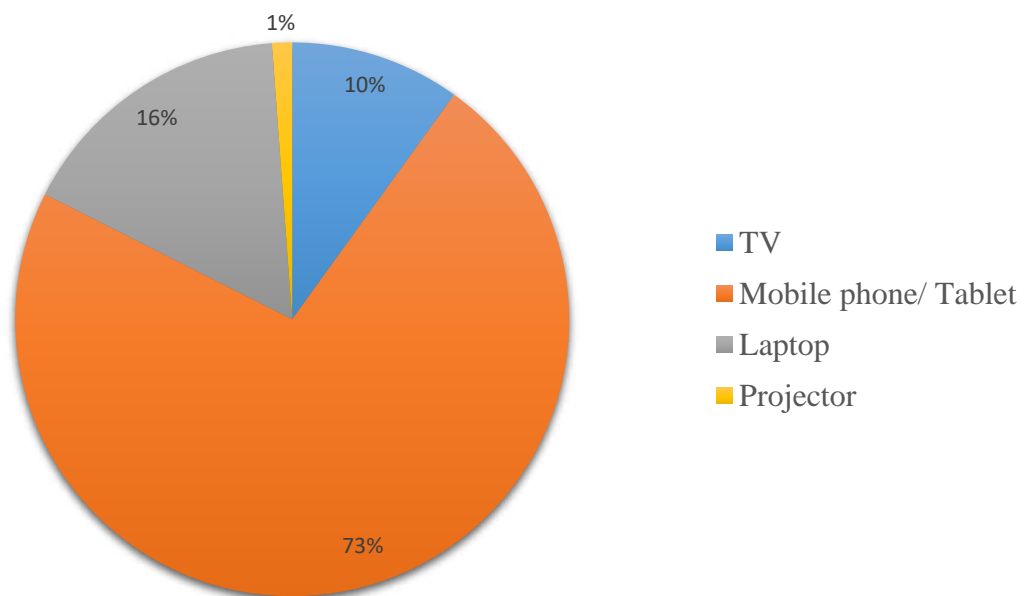
**Inference:**

66% of the respondents were students, followed by 25% of the respondents being Private Employees, 8% of the respondents being employees working in Private Sector, and the rest of them were Government employees.

#### 4. Gadgets used by respondents:

Table No. 4.4 showing the gadgets used for OTT platforms by the respondents		
Particulars	Frequency	Percentage
TV	10	10%
Mobile phone/ Tablet	73	73%
Laptop	16	16%
Projector	1	1%
Total	<b>100</b>	100%

Figure No. 4.4 showing the gadgets used for OTT platforms by the respondents



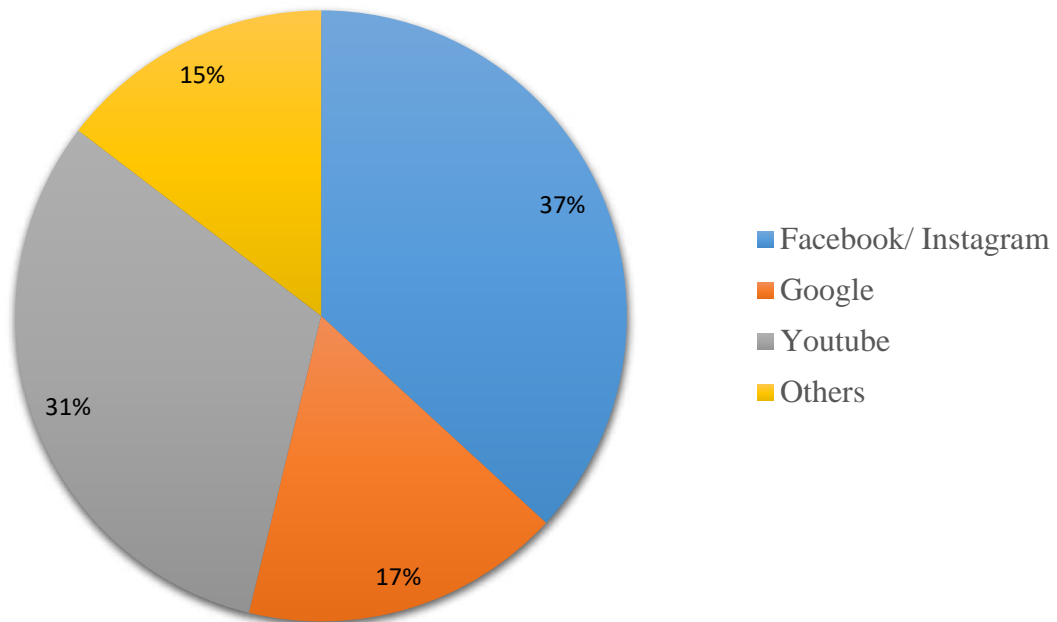
#### Inference:

73 % of the respondents use Mobile Phone/ Tablet, followed 16% using Laptop, followed by 10% using Television and the rest of the respondents use projector.

### 5. Digital Marketing Platform:

Table No. 4.6 showing the digital marketing platform through which respondents gained interest for OTT platforms		
Particulars	Frequency	Percentage
Facebook/ Instagram	37	37%
Google	17	17%
YouTube	31	31%
Others	15	15%
Total	<b>100</b>	100%

Figure No. 4.6 showing the digital marketing platform through which respondents gained interest for OTT platforms



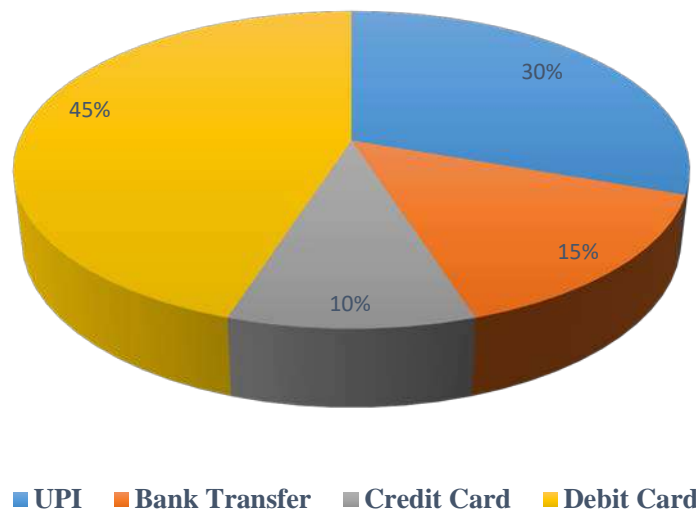
#### Inference:

37 % of the respondents gained interest for OTT platforms through Facebook/Instagram, followed by 32% of the respondents through Youtube, 17% of the respondents through Google and 15 % through other platforms

## 6. Payment Option used:

Table No. 4.11 showing the mode of payment used for subscribing to these platforms by respondents		
Particulars	Frequency	Percentage
UPI	30	30%
Bank Transfer	15	15%
Credit Card	10	10%
Debit Card	45	45%
<b>Total</b>	<b>100</b>	<b>100%</b>

Figure No. 4.11 showing mode of payment used for subscribing to these platforms



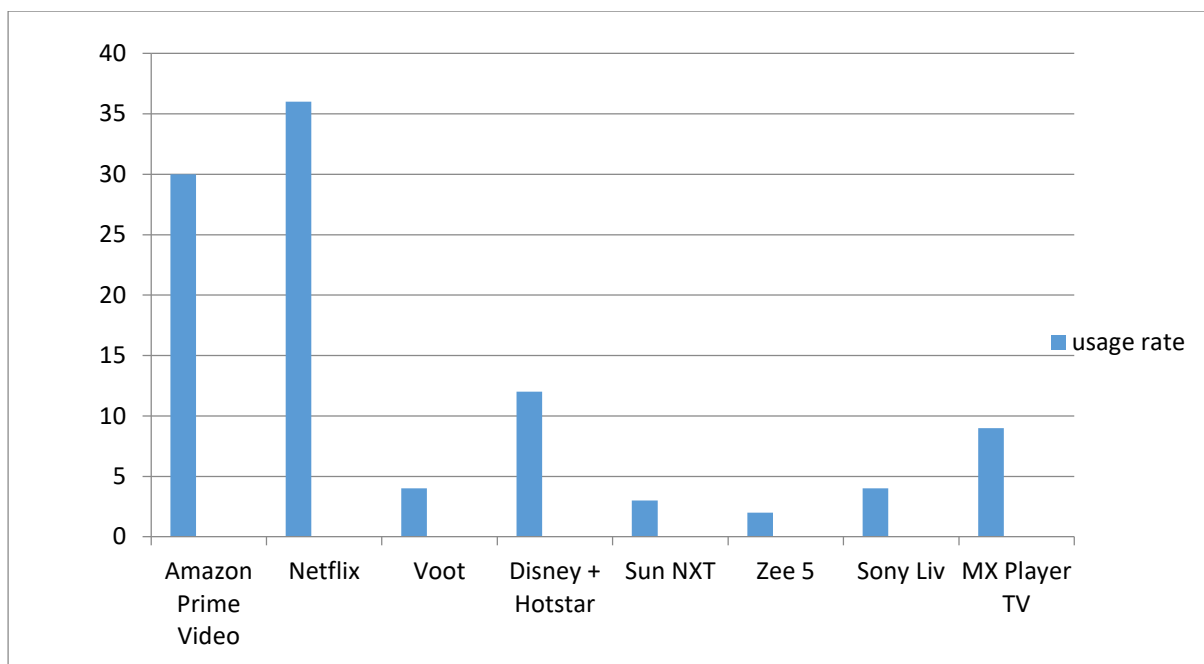
### Inference:

45 % of the respondents use Debit card as the payment option for subscription, followed by 30 % using Unified Payments Interface (UPI), 15 % using Bank Transfer, and 10% using Credit Card.

## 7. Rating According to Usage:

Table 4.12 showing ranking according to usage rate		
Particulars	Frequency	Percentage
Amazon Prime Video	30	30
Netflix	36	36
Voot	04	4
Disney + Hotstar	12	12
Sun NXT	03	3
Zee 5	02	2
Sony Liv	04	4
MX Player TV	09	9
<b>Total</b>	<b>100</b>	<b>100</b>

Figure No. 4.12 showing ranking according to usage rate



## **RESULTS AND DISCUSSIONS**

Based on the analysis of the data conducted following are the major results of the study.

- Majority of the respondents were female (54%) , 45% of the respondents were male, while one respondent preferred not to respond.
- Most of the respondents is in the age group of 19 - 25, followed by 8% of the respondents aged above 35, 6% of the respondents belonged to the age group of 26 – 35 and the least number of respondents was under the age of 18.
- Majority of the respondents were students, followed by 25% of the respondents being Private Employees, 8% of the respondents being employees working in Private Sector, and the rest of them were Government employees.
- On the basis of the analysis done to know the gadgets used by the respondents for accessing OTT platform , 73% of the respondents used mobile phone / tablet, followed by 16% using laptops and rest of the respondents using either television or project.
- The analysis showed that 51% agreed that there was wide reach of advertisement about OTT platform through social media , 25% had a neutral opinion about it , 17% strongly agreed and the rest disagreed to the statement.
- Most of the respondents gained interest for OTT platforms through Facebook/Instagram, followed by 32% of the respondents through Youtube, 17% of the respondents through Google and 15 % through other platforms

## **RECOMMENDATIONS**

- The respondent suggested that movies can be released on the Theatre and OTT same day as well
- OTT platforms can also provide free subscription and cover their cost by advertisement
- Provide playback speed option, which most of the OTT applications doesn't have
- OTT platforms should find a way to work in tandem with movietheatres
- More bonus packages and free trials can be given for customers
- Creating plans to maximize the number of active users on a regular, weekly, and monthly basis.
- Attractive packages to increase the number of subscribers in these platforms.



- Improving audience interactions to increase the life timevalue
- Gathering information about consumer activity and viewing time across platforms and devices.
- Recommend new and featured content using personalized notification messages to attract customers.

## **IMPLICATIONS OF THE STUDY**

India is a huge market for OTT platforms, so offering different plans to satisfy a diverse user base with different income levels is the only solution for faster absorption and growth. Focusing more on Indian-friendly content would be another plus point for OTT providers. For now, it can be said that people will continue to drift towards these platforms, though television would still remain an important commodity in India. There still exists a section of the population that doesn't have access to smartphones and internet. Moreover, the older generation prefers the television over OTT platforms for entertainment.

According to the findings of this report, OTT has entered the majority of the population and has become a part of their daily lives. It has also begun to replace conventional media because it is easier for people to use. By serving as a big source of entertainment, OTT outlets have helped keep people's sanity in these trying times. Almost every streaming service under the sun offers free trials, and users are taking advantage of them. However, the true litmus test is consumer retention accomplished not only by great content but also through great technology. To provide a unified experience for content viewing, OTT providers must implement technology at all stages of the OTT subscriber's lifecycle, beginning with content discovery. By serving as a big source of entertainment, OTT outlets have helped keep people's sanity in these trying times.

## **LIMITATION**

The educational and technical knowledge acted as an impediment during the collection of the data

- ❖ Area coverage is limited to a sample size of Angamaly Municipality only.
- ❖ Personal bias of the respondents affects the reliability of the data collected
- ❖ Due to the continuous changes which happens in our surroundings, we may find that what is relevant today may be irrelevant tomorrow.

## CONCLUSION

96.5 per cent of respondents are able to use OTT channels. Netflix, Amazon Prime, and Hotstar are the most common OTT sites, according to the majority of respondents. According to the findings of the report, respondents believe that factors such as convenience, content quality, subscription fee, user style, ad-free experience, ease of access, and user customization influence their choice of OTT platforms. The report also found that working from home and online learning enhanced the use of OTT platforms.

Since India is a young country, these figures are bound to rise in the coming years, and OTT companies are investing heavily to catch this market. If we were, to sum up, the future of OTT in a single term, it would be an opportunity!

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## **DOES FESTIVAL EFFECT EXIST IN INDIAN STOCK MARKET? - AN EMPIRICAL ANALYSIS**

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### **ABSTRACT**

There are various stock market anomalies has been evolved in the Indian stock markets. Monday effect, Friday effects, Calendar effects, Month-end effect, Year-end effect, Festival effects, etc. But, according to various researchers, they argue that festival effect is evident in Indian stock market. This study helps to understand and evaluate whether festival effect exists in Indian stock market or not. This will help the investors to reap the benefits of anomalies from various sectors in Indian stock market. It throws light on the influence of festival effect on sectorial indices in Indian stock market. Study found that there is no great evidence of festival effects in Indian stock market for the recent years.

**Key words: Anomaly, Festival effect , Calendar effects**

## INTRODUCTION

Festivals are occasions dedicated to celebration and partying. The word fest comes from the Latin word *festivus*, borrowed from the Anglo-Norman French. Festival was first recorded as a noun in his 1589. Prior to that, it had been used as an adjective since the 14th century and meant the celebration of religious festivals. Holidays of religious significance are called religious holidays. These festivals are celebrated in a repeating cycle in the calendar and are celebrated by the religions involved. Religious festivals are celebrated with great interest all over the world, and these festivals are held not necessarily for entertainment, but in honor of certain cardinals such as Germany, in the name of Lord Buddha. Celebrated Buddha Purima is also celebrated on Lord Krishna's birthday as well as Krishna Ashtami. Religious festivals are marked by specific historical events such as births, deaths, conquests and defeats. Festivals affect not only the socio-cultural environment, but also the economic environment of the country. During festivals such as Diwali, Ramzan and Christmas, all devotees buy clothes, ornaments, shoes and food for the occasion. All these economic activities carried out by a large number of people on the days of the festival or on days close to the festival increase the demand for goods and services in the country and thus increase the production of goods and services. Service will be improved. As production and sales increase, so does the company's revenue, which increases profits and profits are distributed among the various stakeholders of the company. Entrepreneurs receive a portion of profits in the form of dividends and employees receive a portion of profits in the form of bonuses. This increases the money supply and increases people's purchasing power. Government revenue in the form of taxes also increases before and after the festival. Therefore, it can be said that the festival can affect the economic environment of the country.

Selected festivals:

- Diwali effect
- Ramadan Effect
- Christmas effect

This study focused on evaluating the influence of festival effect on sectorial indices in Indian stock market.

## REVIEW OF LITERATURE

Tong (2000) found that the Stock market anomalies found in European, Asian and North American markets. Deepak Chawla and Munish Makkad (2000) attempted to test the weak form of efficiency in India. Serial correlation and run tests were conducted on price changes and log price changes to test the random walk hypothesis. The results indicated a tilt in favor of weak form efficiency in the Indian stock market. In 2009, Rahman found out regarding the partial explanation for the weekend effect. Most of the companies will release positive news at the end of the week and negative news will release on the beginning of the week which is highly influenced on the effectiveness of the returns.

In 2010, Bodla, Chhabra and Garg analyzing calendar effects such as monthly effect, Monday effect, Friday effect, turn of the month effect, and semi monthly effects in Indian and US markets. This study shown that there is semi monthly and turn of month effect in US and Indian markets by considering the data from January 1998 to December 2007. In 2014, a study was made by Potharla Srikanth and Dr. Pedapalli Neeraja and it proves that there is seasonal effect on the Indian IT sector. The study has given a light that the BSE Sensex has significant role in the volatility of indian IT sector. Keppler and Xue made a conclusion to the study that there is a higher return periods from November to April than May to October. Smirlock and Starks in 1986 find that the stock price are likely to fall on Monday. Which means closing price of Monday is less than closing price of pervious Friday. Study of Navdeep Aggarwal Mohit Gupta in 2004, shows that there was a new effect called Wednesday effect. On the Wednesday most of the stocks perform well and give high returns. In absence of plausible explanation by the analyst Wednesday is considered by the indian investors as most optimistic day. Nath and davli (2005) studied on day of the week affect during 1999 to 2003 in Nifty and found that there exist market inefficiencies.

A study conducted by Mangala and Sharma (2007) revealed significantly high mean daily returns for the first half of the trading month. The study used daily closing prices of S&P CNX Nifty for a period between January 1994 through April 2005. Agrawal & Tandon (1994) concluded that the stock prices will be increased in the last trading day of the previous month and continues in the next month for the first three days. P.Nageswari et.al.,(2011) analyze about “day of week effect” and given the results which are in favour of efficient market hypothesis that indicates that there is no specific week effect pattern on the Indian stock market.

Analysis by P.Srilath et.al.(2012) shows detail of the week effect in each sectors. In banking sector, they were influenced by Monday and Friday effect, and IT sector are influenced by Thursday effect, FMCG sector influenced by Friday effect and the pharma sector is influenced by Monday, Wednesday and Friday. Akhtar, Samreen, Saghir Ahmad, Valeed, Ansari, Ahmad; Ansari studied and its result was shown that, there was presence of day of the week effect in the volatility index and the equity index, Nifty 50. Mahendra Raj and Damini Kumari found out that there is a negative Monday effect and positive January effects not found in India. In 2013, Potharla Srikanth et.al., made a study on the impact of weekend effects. The result shows that there is weekend effect on banking, FMCG and pharma sector but that is not true in case of IT sector. In 2004, Kaur has made a study on the weekly effects of stock market they collected data of BSE Sensex, S & P CNX Nifty, S & P 500 (US), NASDAQ (US) and got the result that there are positive returns are getting on Wednesdays.

Umesh Kumar(2011) conducted an analysis and found out that there is a festive effect on the stock market on the preceeding and post muhurat trading. But other than the usual weekend effect there are various other anomalies can be seen by different researchers. Duobis and Louvel (1996) examined the French stock market as well as other markets such as US, UK, Germany, Japanese, Australia and Swiss markets. They found out that the returns are higher in Wednesdays and lower in Mondays. In 2001 Steeley in the research found that the weekend effects are no more after the 1990s. Loughani and Chappel (2001) has made a study on the basis of the weekly effect. They formed a conclusion that the trading returns will be high in the time of the first trading day.

Kok Kim Lian in 2002 studied the monthly effect in Asian Pacific stock markets. After the analysis he found that the turn of the month is clearly seen but the half month effect is really few and unstable in the stock markets. Hellstrom (2002) has conducted a study by analyzing 207 stocks in Sweden. They have found that there are positive returns are getting in Tuesdays and negative effects on Fridays during the week. Dr. Rashmita Sahoo conducted analysis for the period of January 2003 to December 2013 by the way of descriptive statistics and regression analysis by considering closing price of BSE 100. As a result, she found out there is no particular effect on the monthly effect in the BSE 100 index.

## **OBJECTIVES OF THE STUDY**

- To know the festival effect exist in the Indian stock market or not.
- To know how the festival effects such as Christmas effect, Ramdan effect and Diwali effect influence on sectorial indices in Indian stock market

## **SOURCES OF DATA**

An analytical study with the secondary sources of data including the yearly reports, official websites of BSE ([www.bseindia.com](http://www.bseindia.com)), NSE ([www.nseindia.com](http://www.nseindia.com)), Confederation of Indian Industries (CII) library, Centre for Monitoring Indian Economy (CMIE) Prowess and annual report library services like Ebsco Services is considered. Additional resources like, working papers, research papers, and economic dailies are also referred for this purpose.

## **THEORETICAL OVERVIEW**

### **DIWALI EFFECT**

In India, the festival of Diwali or Deepawali is celebrated as a symbol of the victory of good over evil. In Sanskrit, the word 'Deepavali' means 'a string of lights', meaning that the brightness cast darkness into people's lives. Diwali is celebrated in the name of Goddess Lakshmi, a sign of prosperity. For different reasons in different parts of the country. In northern India, Diwali is celebrated to celebrate the return of Lord Rama with his wife Sita and his brother Lakshmana after 14 years of Vanavasa (meaning life in the forest). When Rama and Sita come on a 'moonless night', people light oil lamps to illuminate the path of Rama and Sita in the darkness. The North Indian business community believes that the new fiscal year begins on the day of Diwali, and new business books are opened on that day. In the evening people light lamps and bake cakes. In South India, the reasons for celebrating Diwali are different. People celebrate Diwali with the capture of Naraka, an asura from Lord Krishna's consort Satyabhama.

Diwali effect on Indian economy:

Around the world, consumer sentiment and religious beliefs play an It plays an important role in the economic activity of buying and selling goods and services. In a spiritual country like India, festivals have a great impact on economic activity. Diwali, one of the most important festivals in India, influences economic activity in the country. Diwali is a busy shopping season in India and many business families in North India also start the new year on Diwali.



Industries that are directly affected by the festival, such as the clothing industry, businesses that manufacture food such as jewelry and candy, and the paint industry, are also affected by the festival as many people decorate their homes with paintings. New picture for Diwali season. The cracker industry is also one of his biggest sources of income during the Diwali season in India. Angered by this, a large number of weddings are also held during Diwali in South India as this time is considered sacred. All these activities affect the economic activity of the country.

Muhurat trading at stock markets in India:

Muhurat trading is done on stock exchanges in India for one hour in the evening on the occasion of Diwali. Trading Muhurat has been observed on Bombay exchanges for several periods. The main reason for doing Muhurat trading is to welcome the new exercise with a positive sign. Investors who buy shares on Muhurat can hold them for a long time and sometimes they never even sell the shares. It is generally believed that the muhurat trade brings wealth and prosperity throughout the year. On Diwali day, in the evening, stockbrokers do "Lakshmi Puja" on stock exchanges and then they do Mahurat trading.

#### RAMADAN EFFECT

Ramadan is the ninth month of the Islamic Hijri calendar and the month in which the Quran was revealed to Prophet Muhammad. Muslims around the world consider Ramadan to be a month of fasting. This is obligatory for Muslims and one of his five pillars of Islam. During fasting, Muslims should not eat or drink anything from morning till night. Furthermore, Muslims are encouraged to abstain from any wrongdoing and to devote themselves to piety, prayer and charity. Muslims emphasize prayer, recitation of the Qur'an, and giving alms from the previous year's earnings. As a fundamental practice of the Islamic faith, Ramadan brings greater unity and cooperation among Muslim followers. Its main contribution is the greater social support given to society and the close relationship Muslims have with Allah. Beliefs play a very important role in human decisions and actions. Religious values and practices have a significant impact on economic growth. Positive psychology research shows that religion provides a valuable form of social support, inspires optimistic beliefs, and contributes to the well-being of its followers.

In Muslim countries, fasting during Ramadan means Muslims spend the first half of the day hungry, which may have had a negative impact on investor sentiment. things happen. According to religious beliefs, this is a holy month and investors often feel better trading

during the month of Ramadan (. To mark the end of Ramadan, Muslims celebrate Eid-ul- We celebrate Fitr (the festival of Ramadan). Since Eid is Arabic, Feast and Eid-ul-Fitr means breakfast and symbolizes the break of Lent. Eid-ul Fitr is the last three days of Ramadan. It's time to celebrate the end of the blessed and happy month with family and friends. In addition, the prices of pre-Eid food, clothing and basic necessities also increased as people bought for the holidays. After the celebration, the price will revert to its original price. Most Muslim countries use both the Gregorian and Islamic lunar calendars. The Islamic calendar is primarily used for religious activities, while the Gregorian calendar is used for business and governmental purposes. According to the lunar calendar, the month of Ramadan is brought forward by about 10 days each year. The month of Ramadan therefore provides an opportunity to test and identify predictable patterns in returns and stock volatility relative to other months of the year. Stock exchanges are still open on these days. The days of the month of Ramadan are observed by the majority of Muslims.

#### CHRISTMAS EFFECT

It is a Christian religious festival and is celebrated all over the world. It is held on December 25 every year. This festival is celebrated in all states of India and other countries. At Christmas time, many companies. A Santa Claus rally depicts a sustained rise in the stock market that occurs from the last week of December to the first two trading days of January. There are many explanations for why Santas gather, including tax considerations, a general feeling of optimism and happiness on Wall Street, and investing in holiday bonuses. Another theory is that some very large institutional investors, some of them more sophisticated and pessimistic, tend to go on vacation at this time, leaving the market to retail investors, who people tend to be more bullish.

#### Causes of Gathering Santa Claus

Several theories attempt to explain the Santa gathering, including optimism fuelled by the holiday spirit, increased holiday shopping, and holiday bonus investing. Another theory is that this is the time of year when institutional investors go on vacation, leaving the market up to retail investors, who tend to be more upbeat. The term Santa's Gathering was coined in the early 1970s by a stock analyst who noticed an upward trend in profits in the market between the first trading session after December 25 and the first two trading sessions of the new year. While past results can never guarantee future performance, the data seems to confirm that rallies during these time periods happen more often than not.

## ANALYSIS

Paired t-test is used to fix whether the mean of one dependent variable is same or different than other independent variable. This test helps to compare the before and after effect of each festival. The study applied paired t-test to check the before festivals effect on sectorial stock indices in the stock market.

### CHRISTMAS EFFECT

H0: There is no Christmas effect exist in the Indian stock market

H1: There is Christmas effect exist in the Indian stock market

### RAMZAN EFFECT

H0: There is no Ramzan exist in the Indian stock market

H1: There is Ramzan effect exist in the Indian stock market

### DIWALI EFFECT

H0: There is no Diwali effect exist in the Indian stock market

H1: There is Diwali effect exist in the Indian stock market

**Table 1.1. Christmas Effect**

Nifty Indices	Christmas Days	Rest Of Days	P Values
Nifty 50	-0.08642	0.101213	0.358
Nifty 100	-0.08922	0.101213	0.286
Auto	-0.11771	-0.04713	0.348
FMCG	-0.09284	-0.11016	0.997
Metal	-0.11604	-0.04027	0.831
Bank	-0.0689	0.001391	0.111
IT	-0.03916	0.079164	0.232
Finserve	-0.05578	-0.02857	0.191
Media	-0.16519	0.053587	0.915
Reality	-0.14941	0.101213	0.023

The paired sample t-test shows that p value for all sectorial indices are greater than .05 for most of the sectors. The significance value is more than .200 for all sectorial Indices which is 0.05 as the level of significance is 5%. It means the null hypothesis is accepted and alternative hypothesis is rejected which means that there is no before and after effect of Christmas on stock market index of India. Analysis result shows that there is a Christmas effect present in the reality sector only. The p values are higher in all sectors except real estate sector which signifies there is no Christmas effect exists for all these sectors.

**Table 1.2. Diwali Effect**

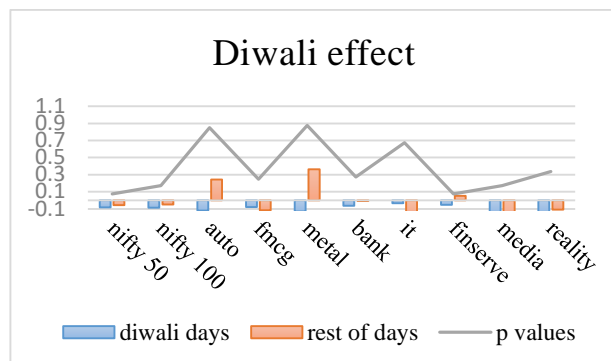
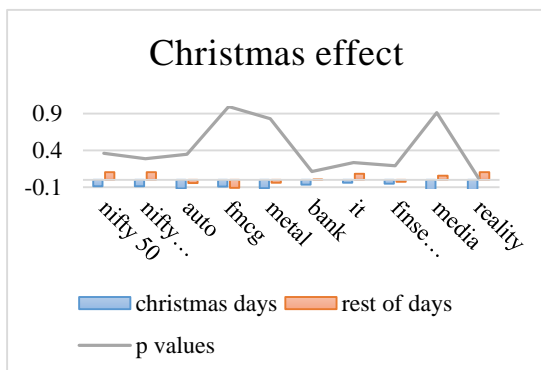
Nifty Indices	Diwali days	Rest Of Days	P Values
Nifty 50	-0.08242	-0.05701	0.076
Nifty 100	-0.08518	-0.04926	0.173
Auto	-0.12048	0.241763	0.849
FMCG	-0.0795	-0.11499	0.246
Metal	-0.13063	0.363816	0.877
Bank	-0.06416	-0.00863	0.273
IT	-0.03299	-0.20882	0.674
Finserve	-0.05209	0.052243	0.074
Media	-0.15132	-0.24558	0.172
Reality	-0.14792	-0.11063	0.337

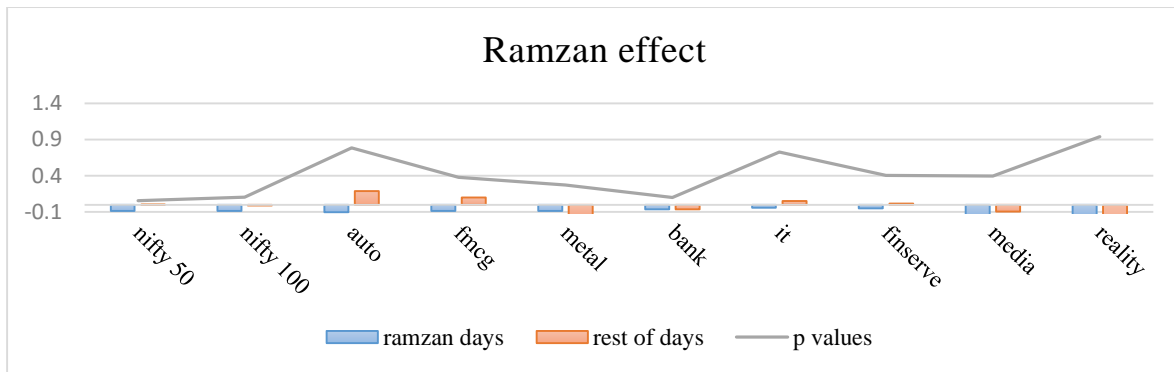
The above data depicts an analysis of Diwali effect on the Indian stock market. The average returns for the year 2014, 2015, 2018, and 2019 indicate a slight Diwali effect. But, the p values are greater than or equal to the 0.05, which is the level of significance. P values are higher in the metal and auto indices and the null hypothesis is accepted. The paired sample t-test shows with higher p values. It means the null hypothesis is accepted and alternative hypothesis is rejected which means that there is no before and after effect of Diwali on the stock market index of India.

**Table 1.3. Ramzan Effect**

Nifty indices	Ramzan days	Rest Of Days	P Values
Nifty 50	-0.08382	0.001783	0.057
Nifty 100	-0.08612	-0.00862	0.107
Auto	-0.10142	0.190084	0.787
FMCG	-0.08488	0.101235	0.381
Metal	-0.08488	-0.17473	0.271
Bank	-0.06394	-0.06284	0.1
IT	-0.03942	0.050826	0.728
Finserve	-0.0477	0.017231	0.407
Media	-0.15194	-0.0915	0.395
Reality	-0.14227	-0.33817	0.939

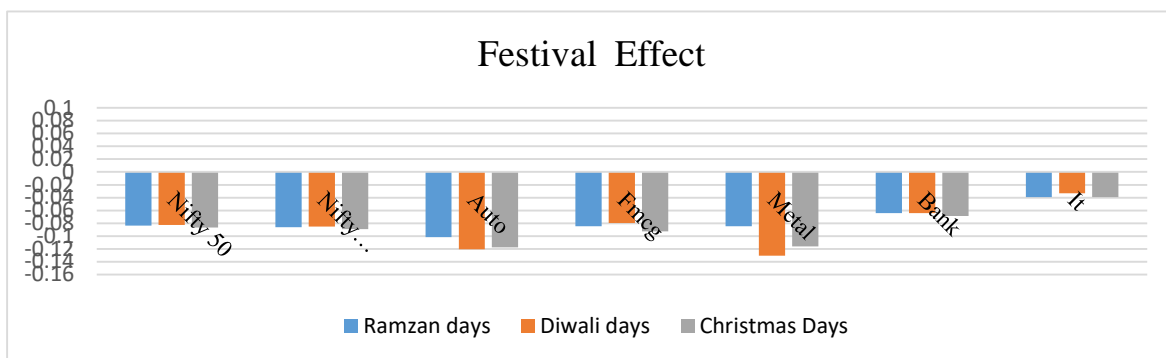
While analyzing the Ramzan effect, a slight positive effect of Ramzan can be seen in the media, reality, banking, and metal sectors. They outperform other sectors in terms of returns. However, since there is no statistical evidence, the null hypothesis must be accepted and the alternative hypothesis should be rejected in the analysis. That is, there is no relationship between Ramzan days and the rest of the days, proving that there is no Ramzan effect in the selected stock indices. Higher p value indicates the the null hypothesis is accepted and alternative hypothesis is rejected which means that there is no before and after effect of Ramzan on the stock market index of India.





**Diagram 1.1. Comparison of festival effects**

The above data show the comparison between the returns of three festivals in India. While doing the analysis, the three returns are almost the same as each other. Only slight differences can be seen while comparing the returns.



This study found that the pre-festivals and post-holidays effect does not exist in Sectorial index of India and it also found that there was no pre/post effect on stock indices in Indian stock market.

## CONCLUSION

While considering the three festivals such as Christmas, Ramzan, and Diwali, a major portion of these sectors deny the festival effects. It is for this reason that minor communities and beliefs may not affect the whole stock market. The December effect can be seen in the reality sector. So, it is good to buy real estate stocks on the adjacent days of Christmas. While considering festival effects, the Christmas effect is only proven in the real estate sector, and all other sectors show there is no relation between festive days and the rest of the days. The study also proves that the returns on the festival days are almost similar for all three festivals.

By applying paired t test it was found that there is no pre and post effect on all stock indices there is no festival effect in Indian stock market.

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## **INTELLECTUAL PROPERTY RIGHTS AND CORPORATE SOCIAL RESPONSIBILITY**

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### **ABSTRACT**

Knowledge capital is an intangible asset, is saved and preserved under the Intellectual property rights acts. Intellectual properties include trademark, designs, copy rights, geographical indicators and patent. Corporate social responsibility (CSR) is the idea that businesses should take into account the interests of society by being accountable for how their operations affect customers, employees, shareholders, communities, and the environment. The goal of every organization is to maximise shareholder dividends, for that the organisation can use the company's rights and power through intellectual property rights. The IPR acts helps the individual to file and register their assets legally. Through this study, it was found that during the years of 2015-20, the trend of increase in number applications filed and registered for the intellectual property. Also studied various companies CSR activities in connection with the Intellectual property rights.

**Keywords: IPR, Design, Patent, Geographical Indicators, Copyrights & Trademark, CSR**

## INTRODUCTION

Intellectual property rights (IPRs) are important in many industries and have formed the foundation for important investment choices. Because IPRs are exclusive rights, striking a balance between the interests of innovators and the interests of society as a whole is always a challenge. Another crucial component is having an effective legal framework to defend inventors' interests and inspire trust in the protection of their intellectual property, which will lead to more innovation (Khandelwal, 2022).

The benefits of innovation and cultural creation are extremely well known in the economic sphere. Intellectual Property Right is a fast-growing factor in the current economy as one of the sources of security for innovative properties which are still open to the public and can be replicated by anyone. It also plays an important role in trade between the nations too. The technological advancement or digitalization caused the stealing of the innovation or the creativity of the individuals. Digitalization is also an output of human capital. Companies rely on adequate protection of their patents, trademarks, and copyrights, while customers make use of IP to ensure that they purchase secure, assured goods (Saha & Bhattacharya, 2011).

As any other physical asset, intellectual property also to get consideration of protection. That is done by the enforcement of law coming under the Intellectual property rights. IPR provided the security to the intangible properties such as patents, trademarks, and copyrights etc. these intangible properties are still open to the public and the replication of it is happening very drastically. The crimes coming under the IP is mainly because of the digitalization and access to the services open to the individuals. Hence it is high time that we place them in the limelight and discuss them with utmost importance.

Developed countries are mainly focusing on the innovations and that results in the huge number of IP. Knowledge capital is the most important asset of every nation. Most production activities of the manufacturing sector depend upon advanced technology and innovation, knowledge, technology-know-how, idea, industrial design and process to increase their production scale (Osano & Koine, 2016; Singh & Ashraf, 2020; Singh, 2021). This will help to increase the competition and also leads to avail the best quality product to the customers with affordable cost. Every organization appreciates the requirement to build a substantial development, companies need to incorporate to community

in a “Win Win” agreement then the organizations go for philanthropic, ethical responsibility, and legal responsibility and economic responsibility (Carroll, 1991)

The private interest and the public interest must be in voluntary alignment. The coronavirus pandemic has made people realise that no nation is prepared to handle a pandemic. The extensive worldwide population cannot be supported by the current infrastructure and healthcare systems. Medical supply rationing is required by hospitals and doctors in order to accommodate patients and preserve as many lives as possible. Losing people due to inability to pay for medical care or medications seems utterly awful. This is against corporate social responsibility, the SDGs, and any company's ethical behaviour. However the manufacture of vaccines, medicines, or other medical devices, necessitates exorbitant costs, extremely advanced techniques, and a great degree of understanding. This in turn necessitates a sizable sum of money. The global pharmaceutical industry utilises Intellectual Property Rights (IPRs) like patents and passes these to pass huge profits from the sale of such medicines making it rather expensive for the final consumers in order to protect the initial investment made by the pharma companies and gather funds.

During the Covid-19 pandemic almost all big pharmaceutical companies are engaged in the race to develop treatments and vaccines. Also, those companies trying to make it available to countries with limited sources available in the field of healthcare. So, all organizations make sure that they have a proper policy in place to recognize the inventions and control the activities in the field of IPR execution. There can be no clear winner in the argument between IPR and CSR, it is crucial for recognising the brains behind an innovation and raising money for additional R&D, and public health, which is a significant part of ethical behaviour and CSR of any organisation. For the benefit of all people, it is crucial that both triumph, making it crucial to maintain a balance between the two.

## **OBJECTIVE OF THE STUDY**

- To present an overview of Intellectual property rights
- To study the trends of Patents, Trademark, GI, copyrights in India
- To study the significance of patents in India by region and stream.
- To study the different organizations CSR activities related to IPR.

## **IPR HISTORY**

The term intellectual property rights originate from Europe. Venice can be considered the cradle of the IP system because it was here that most legal thought in this area took place; laws and processes were created for the first time in the world here, and other countries followed suit in due time (Bainbridge DI. New York: Longman; 2002.). The first copyright was discovered in Italy. The first was the 1856 Act, which was modelled on the British patent system and established a 14-year patent period, which was followed by a slew of further legislation and modifications, (Singh R. Vol. 1. New Delhi: Universal Law Publishing Co. Pvt. Ltd; 2004.) The Indian Patent Act is more than 150 years old. Pradhan Mantri Jan Dhan Yojana (PMJDY).

### *A. IPR INDIA*

Periodic evaluation of financial inclusion policies through mo India is a country with the second largest population all over the world. India is a country rich in stylish and superior quality of articles such as fine fabrics of cotton and silk, embroidery, painted and enamelled wares, swords and knives and gold and silver jewellery were produced in India (INSA, 2001). Knowledge, technology and process can be used to produce goods and services, and development of new technology in the manufacturing sector (Muthoni et al., 2013). National Archives of India evolved from the Imperial Record Department established in 1891 in Calcutta. Later it was transferred to New Delhi. The holdings in the National Archives are in materials including paper, palm leaf, birch bark, and parchment. (Singh, 2022).

The importance of intellectual property can be traced back to the ancient use of stamps on bricks by Roman brick-makers for the purpose of identification and even further back when the leaders of the ancient Greek city of Sybaris granted the creator of a delicious dish a one-year monopoly on cooking it. With the growth of science and technology, as well as global commerce, a lot has changed since then. Intellectual property is a result of human intellect, and the rights granted to it allow its owner to profit from the benefits of that intellectual endeavour by granting them a monopoly. Such a benefit is not always a natural right, and it must be recognized by law.

In India IPR commenced in 1970. The Patents Act, introduced in 1970; and the followed by the Trade Marks Act, 1999; The Copyright Act, 1957; The Designs Act, 2000; The Geographical Indications of Goods (Registration & Protection) Act, 1999; The

Semiconductor Integrated Circuits Layout Design Act, 2000; The Biological Diversity Act, 2002; The Protection of Plant Varieties and Farmers' Rights Act, 2001 (Khandelwal, 2022).

## IPR TRENDS

Intellectual properties protected using the various Act by the government. For that the owners have to apply for the IP registration. The procedure for the registration starts by filing an application in the IP office under CONTROLLER GENERAL OF PATENTS, DESIGN AND trademark (CGDPDTM) coming under government India. CGDPDTM receives, examines the IPR applications and grants them in due course of time.

Initially, the IPR in India focused mainly on patents, designs, and trademarks. But Geographical Indications (GI) Act – 1999 was brought into force on 15th September 2003. Before the TRIPs agreement, GI was not protected in India (Kumari and Reddy, 2006). Similarly, semiconductor IC (integrated circuits) layout design and plant variety and farmers' rights have been protected under the respective acts mentioned. Copyrights are started only in the year 2016-17 only.

Application filed for patents, design, trademark, GI and Copyrights are given below. The data of 2010-2019 is given in the table below. The data shows that large number of applications received in the category of Trademark. Copyrights application filing started from 2016 only. The least number of applications coming under the geographical indicators. From the graph it is evident that every year number of applications filed in each category is in a trend of increasing. Mobile connections and Internet users in India

## METHODOLOGY

The present study is descriptive and analytical in nature. It is based on secondary data which is collected from published document by RBI, NPCI, websites of RBI, Ministry of Finance and other research papers, journals, books, newspapers etc

The paper gives an insight about the IPR registered over the last five years. The source of data used for the study was secondary data. Annual report of Controller General of Patents, Designs & Trademarks (CGPDTM), India ([www.ipindia.nic.in/](http://www.ipindia.nic.in/)) used as the source of collecting the data. The data related to the patents, trademarks, industrial designs and GI

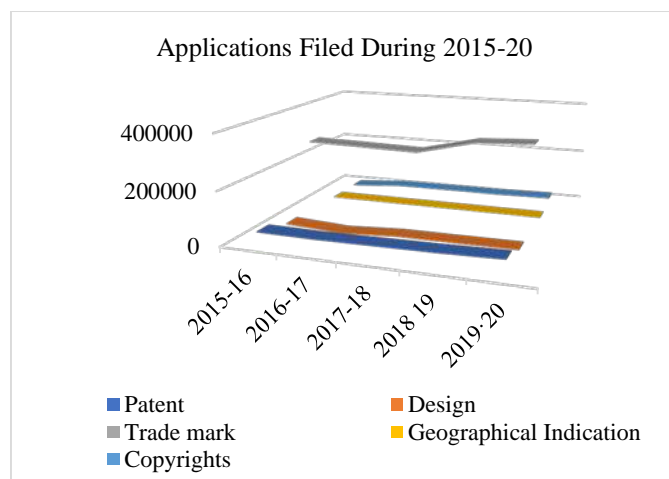
applications filed, examined and granted during the years from 2015-2020 (5 years) are given as a table.

Data on Indian IPR revenue generation were also collected and presented (Table 2) to present the economic value of IP over last 10 years. Besides, data from European Patent Office (EPO) have been considered for evaluation of patent filing and grants in Asia during 2001 to 2012. World Intellectual Property Organization (WIPO) estimates on IP and the ranking of Global Innovation Index (GII) were also considered for this study for pressing the value of Indian research and innovation (Khandelwal, 2022). Also evaluated the corporate social responsibilities of the pharmaceutical companies such as Pfizer and GSK. Both companies are very well known in the industry wise and they introduced the IPR related CSR practices to align with the requirement of WHO.

Year	Patent	Design	TM	GI	CR	Total
2010-11	39400	7589	179317	27	0	226333
2011-12	43197	8373	183588	148	0	235306
2012-13	43674	8337	194216	24	0	246251
2013-14	42951	8533	200005	75	0	251564
2014-15	42763	9327	210501	47	0	262638
2015-16	46904	11108	283060	14	0	341086
2016-17	45444	10213	278170	32	16617	350476
2017-18	47854	11837	272974	38	17841	350544
2018-19	50659	12585	323798	32	18250	405324
2019-20	56267	14290	334805	42	21905	427309

Table 1: 10 years trend in application of Patents, Design, Trademark, GI and Copy Rights

Source: Annual report of CGDPDTM 2019-20



Graph 1: 05 years trend in application of Patents, Design, Trademark, GI and Copy Rights  
 Source: Annual report of CGDPDTM 2019-20

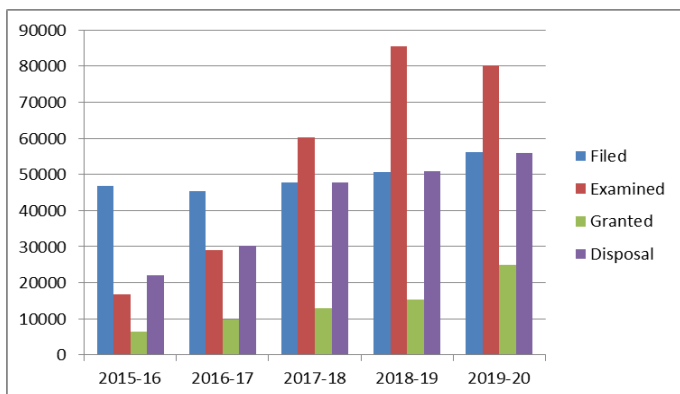
**i. Trends In Patents**

A patent is used to prohibit the use, selling, by another party for a defined period of time, of original production. In brief, a sovereign authority awards the inventor the IP right after an examination of its viability (Saha & Bhattacharya, 2011). During the years 2015- 2020, around 2.5 lakh applications filed for granting patents. The table 2 show the status of the patents registered in these 5 years. Smartphone users in India 2013-2025

Year	2015- 16	2016- 17	2017- 18	2018- 19	2019- 20
Filed	46904	45444	47854	50659	56267
Examined	16851	28967	60330	85426	80080
Granted	6326	9047	13045	15203	24936
Disposal	21987	30271	47695	50884	55945

Table 2: Patents filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20



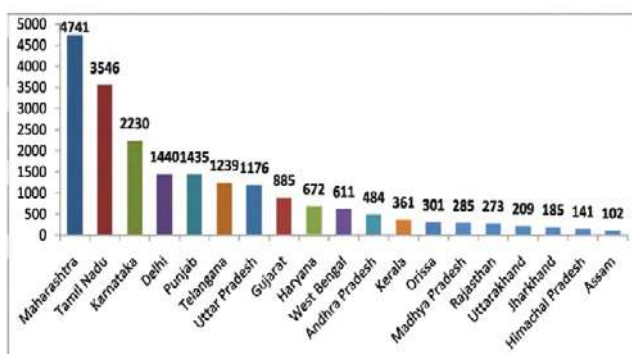
Graph 2: Patents filed, examined and granted during 2015-20

Source: Annual report of CGDPDTM 2019-20

From the table and graph, it was clear that the number of applications filed, examined, granted and disposed in each year was in a trend of increasing. The highest number of applications filed in the 2019-20, that is 56267 applications. There is an increase of 11% in the case of application filing of patents. Application filing happened in these years was mainly in the areas like Biochemistry, Bio medical engineering, bio technology, chemical, communication, computer science etc. (Annual report 2019-20). Patent applications filed by both Indians and Foreigners.

In the year 2019-20, the number of Indian applicants for the patents was 20843. That is the 63% of the total applications were from the foreign applicants. There was a consistent growth in the applications filed for patenting.

State wise applications statistics in the year 2019-20 was given in the chart below.



Graph 3: Patents filed, examined and granted during 2015-20

Source: Annual report of CGDPDTM 2019-20



Maharashtra was the state with highest number of applications (4741) and Tamandu was in the second position (3546). Kerala filed 341 patent applications. The applications were categorized as natural person, Start-ups, small entity and other than natural person. The applications were given by the field of information technology, scientific R & D organizations and academic institutes and universities. The highest number of patents filed by the Indian Institute of technology (664) and from Lovely professional university (442) applied. MESBRO technologies private LTD applied 425 patents from Information and technology. Council of scientific and Industrial research filed 169 cases.

The highest number of foreign applications filed during 2019-20 the Paris Convention was 3637. But there is a decrease of 7% showed compared to the previous year. The top filing country was USA with 8718 filings. Japan and China were in the second and third positions. Huawei technologies Co LTD and QUALCOMM incorporated filed more than 1400 cases.

## ii. Trends In Design Applications

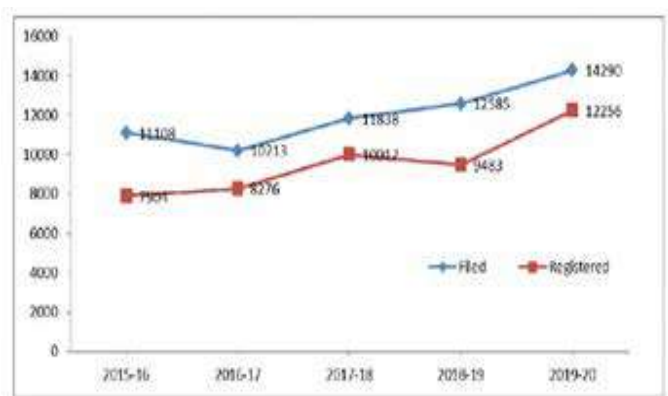
Design applications in India was administrated by Design ACT 2000 and it was amended in the year 2008, 2014. Locarno classification system used for the design registration filing. India is also a member of it. Highest number of applications filed was in the year 2019-20

Year	2015-16	2016-17	2017-18	2018-19	2019-20
Filed	11108	10213	11837	12585	14290
Examined	9426	11940	11850	12661	13642
Registered	7904	8276	10020	9483	12256
Disposal	23	8332	10788	11414	14701

Table 3: Design filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

The trend of applications filed during 2015-20 was represented in graphically as shown in below.



Graph 4: Design filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

Trend shows the increase in the filing and registering of application were increased over the years. Applications from the Indian and Foreign applicants were received during these days. The highest number of applications received from the Maharashtra. Delhi and Gujarat followed by it. Sabyasachi couture filed highest number of applications. USA was the country with highest number of design applications.

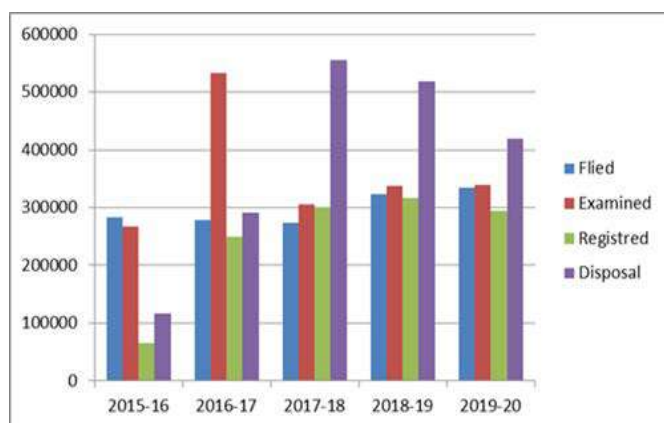
### iii. Trends In Trademark

Trade mark registry taking the filing of applications of Trademark under the Trademarks Act 1999. Trademark rule introduced in 2003 and it is replaced as Trademark s Rule in the year 2017. Trademark registration gives protection to the goods and services for the prevention of the fraudulent marks on the merchandise in the country. The head office of the Trademark registrar located in Mumbai.

Year	2015-16	2016-17	2017-18	2018-19	2019-20
Flied	283060	278170	272974	323798	334805
Examined	267861	532230	306259	337541	338551
Registered	65045	250070	300913	316798	294172
Disposal	116167	290444	555777	519185	419566

Table 4: Trademark filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20



Graph 5: Trademark filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

Trademarking increased in 2019-20 compared to the previous years. Foreign and Indian applicants were registered under the trademarking registrar. Maharashtra and Delhi registered more than sixty thousand applications. USA and China were the two countries with highest number of foreign applicants. The highest number of applications came under the medical and pharmaceuticals around 52000. Advertising, Business management and business administrations were coming as second in the list.

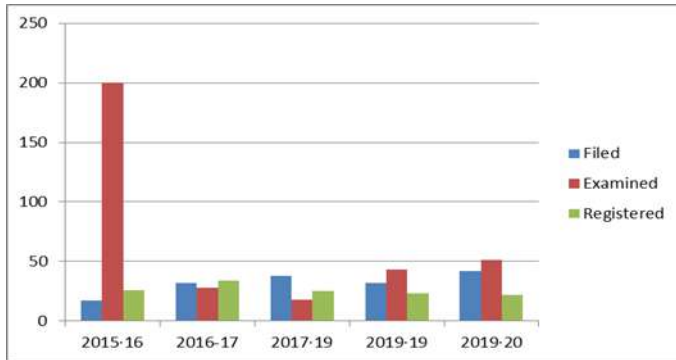
#### iv. Trends In Geographical Indication

Year	2015-16	2016-17	2017-18	2018-19	2019-20
Filed	17	32	38	32	42
Examined	200	28	18	43	51
Registered	26	34	25	23	22

Table 5: Geographical Indication filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

Geographical indicators registry, situated in Chennai helps to monitor the activities coming under the realm of Geographical indicators of goods act, 1999. The main objective of GIR is to register and protect the GIs. GI registration started in the year 2003. Total number of GI applications registered up to 2019-20 was 687. 365 GI registrations were made from the received applications. Karnataka, Tamil Nādu and Maharashtra were the 3 states with highest number of GI registrations. Highest GI applications registered for the agriculture product and the Handcraft including clothing.



Graph 6: Geographical Indication filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

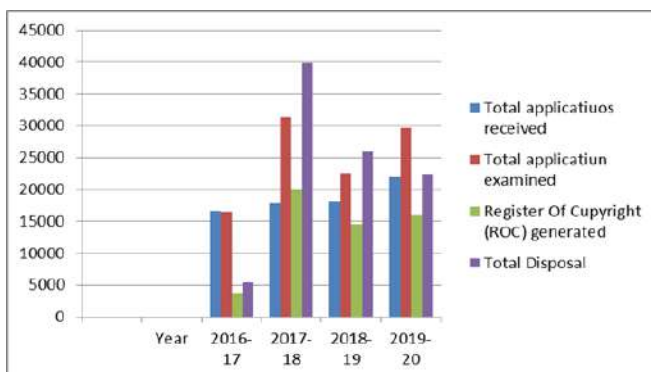
### v. Trends In Copyright Applications

Copyright administration was done by the Copyright act 1957. It says that copy right is the right of an owner of a work to control the uses of work financially benefit from its exploitation. Copy right office is taking care of the application filing, examining and registration. It was established the practice ad procedure manual for the examination of Literary, artistic, musical, sound recording and cinematograph films

Year	Filed	Examined	Registered	Disposal
2015-16	0	0	0	0
2016-17	16617	16564	3596	5444
2017-18	17811	31388	19997	39799
2018-19	18250	22658	14625	25943
2019-20	21905	29670	16029	22516

Table 6: Copyright filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20



Graph 7: Copyright filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

The number of applications received in each year showing a trend of increasing. From the annual report of the year 2019-20 indicated that the artistic copy rights registered were 4710, literary or drama (9106), computer soft wares (1057) and sound recording (837).

### **Corporate social responsibility (CSR)**

CSR is the idea that businesses should take into account the interests of society by being accountable for how their operations affect customers, employees, shareholders, communities, and the environment.

Organizations are considered as being under a voluntary commitment to go above and beyond the legislative requirement to comply with the law in order to improve the quality of life for employees, their families, local community, and society at large. It concurrently help to value maximization for shareholders as well as stakeholders and build brand differentiation through various methods. So that the organization need to structure a portfolio of IPR and enforcing it can be done in a manner which is socially responsible. But trying to be seen as 'doing no evil' with your IPR can be quite a challenge, as Elon Musk has discovered.

Almost all large corporations have realised over the past couple of decades that it is no longer sufficient to just create value for their shareholders. It is crucial that they are viewed favourably by the markets and cultures in which they conduct business and behave with corporate social responsibility (CSR). Especially pharmaceutical firms are under pressure from corporate social responsibility to share their interests with all of their stakeholders as a kind of social redistribution, not just with their shareholders.

### **Organizations That Promote IPR Through CSR**

The WHO defines essential medicines as those that "are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality, and at a price the individual and the community can afford" and "are intended to satisfy the priority health care needs of the population" (WHO, 2013). The increasing access to current interventions, such as medicines for infectious diseases, maternal and child health, and noncommunicable diseases, would save more than 10.5 million lives by 2015 (WHO 2004), making the human right to essential medicines a derivation of the rights to health and life (Marks, 2009). In particular, and as a result of the

AIDS pandemic, the dire need for HIV treatment contributed to the realisation that access to necessary medications, including antiretroviral treatments (ARTs), is a human right. GlaxoSmithKline (GSK), a British multinational pharmaceutical, is the world's second-largest pharmaceutical business and a global leader in the provision of pharmaceuticals invented the medicines for HIV/AIDS, malaria, and tuberculosis, the three most important diseases in the developing world, and to treat them. GSK was the first firm in the sector to tackle the issue of patient access to medications as a strategic consideration, incorporating it not just into its CSR strategy but also into the company's overall strategy. They met with a difficulty in demonstrating how strategically implemented CSR activities may generate both economic and social value.

PFIZER, is one of the world's leading pharmaceutical companies, founded more than 170 years ago. Pfizer Limited is specialise with expert therapy in 4 business categories - Vaccines, Hospitals, Internal Medicine and Inflammation and Immunology. Indians have displayed a spirit of innovation and demonstrated an ability to find creative solutions to emerging challenges. Young researchers and scientists need to harness this innately creative and innovative mindset and the desire to do good, to find solutions to India's pressing healthcare problems. Pfizer has partnered with IIT-Delhi to create a Pfizer IIT Delhi Innovation and IP Program to foster the development of cutting-edge innovations that solve real-life healthcare challenges faced by patients or healthcare professionals. Through this Program, we support incubation and IP filing of start-ups with promising ideas that can truly add value to healthcare delivery in the country. This incubation accelerator initiative is in line with the government's priority of 'Start up India, Stand up India' and is a great example of the merits of academia and industry collaboration. Since its inception in 2015-16, the program has supported 34 innovators through full-time incubations and provided support for IP filings.

## **CONCLUSION**

India is country with abandoned in history, culture and traditional knowledge. Also promote the research and innovation activities in respective sectors and boosting towards the IPR activities. IPR activities start from the filing of the applications. The applications were accepting from the Indian applicants as well as from the foreign applicants. As a result, the total number of applications filed during the year 2015-20 were 18,74,739 and the registered applications were 13,97,871. The highest number of applications in most IPR

is mainly from the Maharashtra. However, from the study it was evident that the increase in the filing of the applications and registering of the patents. This paper also give insights on the topic of the effect of IPR in CSR in pharmaceutical industry. Effective CSR typically requires planning, management, and continuous evaluation because it is an investment in the future of the firm. According to Porter & Kramer (2006), businesses must include a social perspective in their fundamental model used to analyses competition and determine their business strategy. Research and innovation are a business discipline in Indian system which helps to generate sustainable growth and development.

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## **DIGITAL SIGNATURE IN INCOME TAX RETURN FILING**

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### **ABSTRACT**

Everyday new technologies are brought and progressed in a rapid way in all fields. E-submitting is a new generation method to tax payers for filing their income tax via on-line mode. E-filing is an effective way of filing income tax return online and make payment of tax with digital signature. It saves our golden time, strength, fee and also reduces our anxiety. So, the tax payers are required to use E-filing centers. This examines that the existing customers are satisfied with the E-filing facilities but most of the tax payers are not aware of the E-submitting procedures. So sufficient steps are required to create greater awareness within the minds of tax payers regarding E-submitting of earnings tax with the aid of digital signature.

Index Terms—Taxpayers, E-filing, digital signature, tax

### **INTRODUCTION**

The advanced technology is seen everywhere, from e-ticking to e-filing the tax return, everything can be done easily at the comfort of your home. The main requirement to be

furnished while filing an income tax return online is to affix your digital signature with your tax return documents so that it will authenticate these documents. In the IT Act 2000, a digital signature enjoys the identical status as a normal signature. It attests and verifies that the taxpayer has authenticated the tax return documents in secure surroundings, without fraud. Virtual or Digital signatures, that are issued by Certification authorities, contain particulars just like the taxpayer's name, public key, name of issuing Certification Authority, expiration date of public key(12years), the digital signature and its serial wide variety. Tampering with digitally signed files and claiming forgery over digital signatures isn't a viable option, especially since some assessments are nearing completion to confirm the same. Changes and additions to digitally signed files are also included in the signing process.

## **LITERATURE SURVEY**

Abdelbaset Mohammad demonstrated in [8] "A review paper on cryptography" how the various algorithms are used in cryptography. It will continue to emerge with IT and business plans in regard to protecting personal, financial, medical and e-commerce data and providing a respectable level of privacy.

S.R Subramanya stated in [9] "Digital signatures" that he implemented the concept of creating and verifying digital envelopes using and without signed messages. In addition, he explained it in opening a digital envelopes and verifying a digital signatures.

Dr.R. K Gupta pointed out in [10] "A review paper on concepts of cryptography and cryptographic hash function" that make comparisons between various cryptographic algorithms and different hash functions which help to understand the crux of cryptography.

Sadkhan S.B highlighted in [11] "Cryptography: Current status and future trends" current status of the Arabic industrial and academic efforts in this field in the past that are related to the existing cryptographic methods and new evaluation methods for the security of information. He defined the main processes and trends of the fields in cryptography from the time of Julius Cesar to the modern era.

Dr. Ananth Sheshasaayee defined in [12] "Digital signatures security using cryptography for industrial applications" showcased the propelled marks diminish time and furthermore tries by extending the security. Practically as imprints empower acknowledgement and check of

the believability of paper records propelled marks fill the need of endorsement and affirmation of electronic reports.

Moving forward with the goals of cryptography, Prateep Kumar concluded in [13] that cryptography is used to check confidentiality of a message which ensures that message privacy is maintained.

## **CRYPTOGRAPHY**

Cryptography is a method of defensive facts and communications through the usage of codes, so that only those for whom the information is intended can read and process it. In computer science, cryptography refers to comfy data and conversation techniques derived from mathematical concepts and a set of rule-based calculations called algorithms, to transform messages in different ways which might be difficult to decipher. These deterministic algorithms are used for cryptographic key technology, digital signing, verification to defend data privateness, web surfing at the internet and private communications which includes credit card transactions and email.

### **A. Objectives of cryptography**

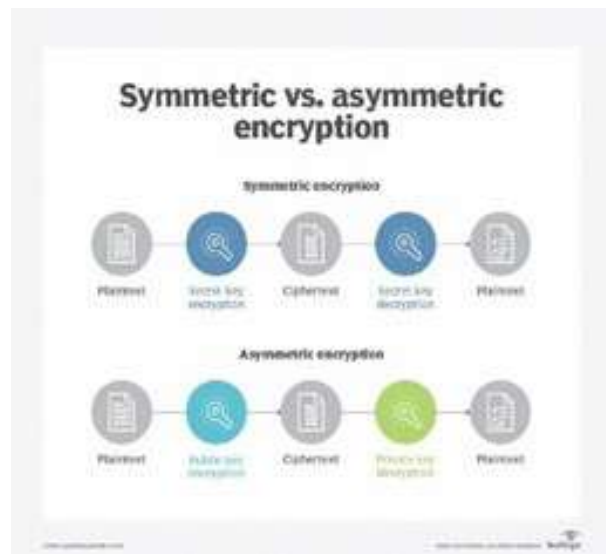
- Confidentiality: The information cannot be understood by anyone for whom it was accidental.
- Integrity: The statistics can't be altered in storage or transit between sender and supposed receiver without the alteration being detected.
- Non-repudiation: The creator/sender of the information cannot deny at a later degree their intentions in the advent or transmission of the facts.
- Authentication: The sender and receiver can affirm every other's identity and the starting place/vacation spot of the statistics.

### **B. Types of cryptography**

Symmetric-key encryption algorithms create a fixed length of bits known as a block cipher with a secret key that the sender uses to encrypt data (encryption) and the receiver uses to decrypt it(decryption). This requires only a single key for both encryption and decryption process. Block and Stream algorithms comprise symmetric key cryptography, which is widely used on the Internet today. Two popular encryption algorithms are the Advanced

Encryption Standard (AES) and the Data Encryption Standard (DES). This method of encryption is often faster than symmetric encryption, but it allows both the sender and the data receiver to have access to the secret key.

Asymmetric key algorithms: It use a pair of keys, a public key associated with the sender for encrypting messages and a private key that only the receiver knows for decrypting that information. This required two keys: one for encryption and the other for decryption. When someone wants to send an encrypted message, they will retrieve the recipient's public key from a shared directory and use it to encrypt the message until it is sent. The receiver will next use their associated private key to decrypt the message. When the sender encrypts a message with their private key, the message can only be decrypted with the sender's public key, allowing the sender to be authenticated. These encryption and decryption operations are fully automated, so users do not have to manually lock and unlock messages. Figure 1 shows the types of cryptography.



**Fig. 1. Types of cryptography**

## **DIGITAL SIGNATURE**

A mathematical algorithm is routinely used to validate the authenticity and integrity of a message using a digital signature, which is a type of electronic signature (e.g., an email, a credit card transaction, or a digital document). Digital signatures are used to identify users and protect information in digital messages and documents by creating a virtual fingerprint that is unique to them. The email content becomes part of the digital signature in emails. Electronic signatures such as digital signatures are far more secure than other types of

electronic signatures. Digital signatures can offer proof of origin, identity and standing of digital files, transactions or digital messages. Signers also can use them to renowned knowledgeable consent. In many countries, including the United States, digital signatures are considered legally binding inside the identical manner as conventional handwritten record signatures.

#### A. How DSC works

Digital signatures are based on asymmetric key cryptography or public key cryptography. Using a public key algorithm, such as RSA algorithm, two keys are generated, creating a linked pair of keys, one private key and one public key. Digital signatures work through asymmetric key cryptography's two mutually authenticating cryptographic keys. The individual who creates the DS uses a private key to encrypt signature-related data, the only way to decrypt that data is with the signer's public key. If the recipient cannot open the document with the signer's public key, there's a problem with the document or the signature. This is how digital signatures are authenticated or valid. The comparison shows in Table I.

#### B. Different classes of Digital signature

- Class 1 Certificate: These are issued to individuals or private users. This Certificate confirms that the user's name and email ID are valid and approved by the Certifying Authorities on their database.
- Class 2 Certificate: These are issued only to business personnel and individuals. They confirmed that the information in the application provided by the subscriber is the same as the information in popular consumer databases.
- Class 3 Certificate: These are issued only to individuals and organizations. They are very high assurance certificates, mainly for the purpose of e-commerce applications. It is issued when the individual appears in-person before the certifying authorities.

#### C. Benefits of digital signature

- A digital signature can't be edited or tampered with.

- It is secure to track a digitally signed document.
- It brings down the wastage of paper and is eco- friendly.
- Helps the efficiency of the entire e-filing process.
- Reduces cost.

	Digital Signature
Visible	No
Unobtrusive	Yes
File changes	Not allowed
Virtually attached to file	Yes
Physically embedded in file	No
Data authenticity	Yes
Copyright protection	Yes
Global identification	partial

TABLE I DSC COMPARISON

#### D. Certifying authorities for Digital signature

The licensed certifying authorities who authorized by government appointed Controller of Certifying Authority:

- 1) Safe encrypt
- 2) Capricorn CA
- 3) IDRBT
- 4) GNFC

- 5) Mudra CA
- 6) NSDL e-Gov CA
- 7) Indian Air Force
- 8) Verasys CA
- 9) CDAC CA

#### E. How to get digital signature

The purpose of obtaining a digital certificate, the user will have to submit certain documents to the certifying authority (CA). It includes an application form that has been duly signed, a passport size photo, an identification proof, Aadhaar card number, PAN card verification etc. The applicant may be asked to provide the mobile number, email address, home or organization address of the user. The different countries will have different requirements from the applicants for the issuance of digital signature certificate. The process of obtaining digital signature certificates varies depending on the certifying authorities.

#### F. Mandatory taxpayers for ITR filing using DSC

Digital signature certificates are mandatory for some services / user categories such as e-Verification of returns filed by political parties and companies as well as other persons whose accounts are required to be audited under Section 44AB of the Income Tax Act. In other case, it is optional.

#### G. Steps to create DSC in ITR filing

- 1) Fill up the Income Tax Return form, generate the file as an XML (Extensible Mark-up Language) file and save it.
- 2) Step in to the Income Tax India website. Log in to your account using your user password and ID.
- 3) After login, click on the tab “Submit Return” and then select the assessment year.
- 4) Select the Income Tax Return Form Name from the drop-down menu list.
- 5) The next field will be “Do You Want to Digitally Sign the File?” Then select the “Yes” button.
- 6) Select the type of digital signature you want to use, it can be “Sign with USB Token” or “Sign With .PFX file”.
- 7) Upload the ITR with the help of digital signature certificate and verify it.



## H. Current problem in taking DSC

As previously stated, the signature is signed with the USB token after the digital signature certificate has been verified and approved by certified authorities. The password will be included in the DSC. There's a chance you can lose your USB token. If it is lost, or hackers can quickly track down the clients DSC by targeting all of their authentication information. This is a fairly rare problem in this field.

## **PROPOSED SYSTEM**

The problem mentioned above is an example of a threat. We can use an OTP password with the USB token to get around this situation. If someone tried to access the USB Token, they could easily access the password that has been attached to it. So, the proposed system states that it may also request an OTP verification in addition to the password. Only the client's mobile number will receive the OTP password. As a result, this will provide a security mechanism which is useful in future attacks. The following figures are depicted as follows: There are 2 types of phases:

Login phase and verification phase. The pictorial representation shows in Figure 2 and Figure 3

### A. Login phase

During the login phase, the user will enter their credentials into the page during the login step. It will verify whether the records provided are valid or not. It will go to the verification stage if it is valid; else, it will be refused. This is the only way the user may access the digital signature. Actually, this is the initial action and the verification step will follow this procedure.

PHASE 1 :



Fig. 2. Login Phase

## B. Verification phase

PHASE 2 :

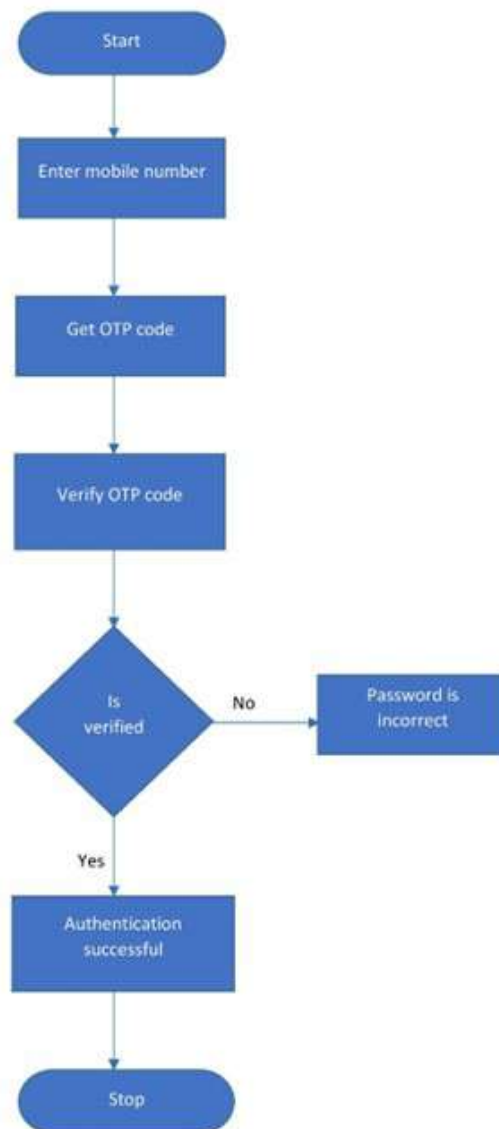


Fig. 3. Verification Phase

In the verification phase, the user must input his or her mobile number after logging in to receive the OTP code. Then it must be confirmed. The authentication is successful if it is validated; else, it will be rejected since the password is invalid. Now you can access the digital signature.

## CONCLUSION

From the above study, the usage of ITR filing using DSC must be focused to make a better way of using online method in a developing country like India. Still the usage of DSC is increasing day by day among the citizens for its secure techniques. This study focuses on the digital signature and its authentication process. The basic objective of research is to provide an awareness about DSC and its basic attacks. The majority of individuals are unaware of this problem. The paper aids them in raising awareness about the problem. This case study will be implemented in the future research.

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## **INTELLECTUAL PROPERTY RIGHTS AND CORPORATE SOCIAL RESPONSIBILITY**

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### **ABSTRACT**

Knowledge capital is an intangible asset, is saved and preserved under the Intellectual property rights acts. Intellectual properties include trademark, designs, copy rights, geographical indicators and patent. Corporate social responsibility (CSR) is the idea that businesses should take into account the interests of society by being accountable for how their operations affect customers, employees, shareholders, communities, and the environment. The goal of every organization is to maximise shareholder dividends, for that the organisation can use the company's rights and power through intellectual property rights. The IPR acts helps the individual to file and register their assets legally. Through this study, it was found that during the years of 2015-20, the trend of increase in number applications filed and registered for the intellectual property. Also studied various companies CSR activities in connection with the Intellectual property rights.

**Keywords: IPR, Design, Patent, Geographical Indicators, Copyrights & Trademark, CSR**

## **INTRODUCTION**

Intellectual property rights (IPRs) are important in many industries and have formed the foundation for important investment choices. Because IPRs are exclusive rights, striking a balance between the interests of innovators and the interests of society as a whole is always a challenge. Another crucial component is having an effective legal framework to defend inventors' interests and inspire trust in the protection of their intellectual property, which will lead to more innovation (Khandelwal, 2022).

The benefits of innovation and cultural creation are extremely well known in the economic sphere. Intellectual Property Right is a fast-growing factor in the current economy as one of the sources of security for innovative properties which are still open to the public and can be replicated by anyone. It also plays an important role in trade between the nations too. The technological advancement or digitalization caused the stealing of the innovation or the creativity of the individuals. Digitalization is also an output of human capital. Companies rely on adequate protection of their patents, trademarks, and copyrights, while customers make use of IP to ensure that they purchase secure, assured goods (Saha & Bhattacharya, 2011).

As any other physical asset, intellectual property also to get consideration of protection. That is done by the enforcement of law coming under the Intellectual property rights. IPR provided the security to the intangible properties such as patents, trademarks, and copyrights etc. these intangible properties are still open to the public and the replication of it is happening very drastically. The crimes coming under the IP is mainly because of the digitalization and access to the services open to the individuals. Hence it is high time that we place them in the limelight and discuss them with utmost importance.

Developed countries are mainly focusing on the innovations and that results in the huge number of IP. Knowledge capital is the most important asset of every nation. Most production activities of the manufacturing sector depend upon advanced technology and innovation, knowledge, technology-know-how, idea, industrial design and process to increase their production scale (Osano & Koine, 2016; Singh & Ashraf, 2020; Singh, 2021). This will help to increase the competition and also leads to avail the best quality product to the customers with affordable cost. Every organization appreciates the requirement to build a substantial development, companies need to cooperate to community in a “Win Win” agreement then the organizations go for philanthropic, ethical responsibility, and legal responsibility and economic responsibility (Carroll, 1991)



The private interest and the public interest must be in voluntary alignment. The coronavirus pandemic has made people realise that no nation is prepared to handle a pandemic. The extensive worldwide population cannot be supported by the current infrastructure and healthcare systems. Medical supply rationing is required by hospitals and doctors in order to accommodate patients and preserve as many lives as possible. Losing people due to inability to pay for medical care or medications seems utterly awful. This is against corporate social responsibility, the SDGs, and any company's ethical behaviour. However the manufacture of vaccines, medicines, or other medical devices, necessitates exorbitant costs, extremely advanced techniques, and a great degree of understanding. This in turn necessitates a sizable sum of money. The global pharmaceutical industry utilises Intellectual Property Rights (IPRs) like patents and passes these to pass huge profits from the sale of such medicines making it rather expensive for the final consumers in order to protect the initial investment made by the pharma companies and gather funds.

During the Covid-19 pandemic almost all big pharmaceutical companies are engaged in the race to develop treatments and vaccines. Also, those companies trying to make it available to countries with limited sources available in the field of healthcare. So, all organizations make sure that they have a proper policy in place to recognize the inventions and control the activities in the field of IPR execution. There can be no clear winner in the argument between IPR and CSR, it is crucial for recognising the brains behind an innovation and raising money for additional R&D, and public health, which is a significant part of ethical behaviour and CSR of any organisation. For the benefit of all people, it is crucial that both triumph, making it crucial to maintain a balance between the two.

#### *OBJECTIVE OF THE STUDY*

- To present an overview of Intellectual property rights
- To study the trends of Patents, Trademark, GI, copyrights in India
- To study the significance of patents in India by region and stream.
- To study the different organizations CSR activities related to IPR.

## **IPR HISTORY**

The term intellectual property rights originate from Europe. Venice can be considered the cradle of the IP system because it was here that most legal thought in this area took place; laws and processes were created for the first time in the world here, and other countries followed suit in due time (Bainbridge DI. New York: Longman; 2002.). The first copyright was discovered in Italy. The first was the 1856 Act, which was modelled on the British patent system and established a 14-year patent period, which was followed by a slew of further legislation and modifications, (Singh R. Vol. 1. New Delhi: Universal Law Publishing Co. Pvt. Ltd; 2004.) The Indian Patent Act is more than 150 years old. *Pradhan Mantri Jan Dhan Yojana (PMJDY)*.

### **A. IPR INDIA**

Periodic evaluation of financial inclusion policies through mo India is a country with the second largest population all over the world. India is a country rich in stylish and superior quality of articles such as fine fabrics of cotton and silk, embroidery, painted and enamelled wares, swords and knives and gold and silver jewellery were produced in India (INSA, 2001). Knowledge, technology and process can be used to produce goods and services, and development of new technology in the manufacturing sector (Muthoni et al., 2013). National Archives of India evolved from the Imperial Record Department established in 1891 in Calcutta. Later it was transferred to New Delhi. The holdings in the National Archives are in materials including paper, palm leaf, birch bark, and parchment. (Singh, 2022).

The importance of intellectual property can be traced back to the ancient use of stamps on bricks by Roman brick-makers for the purpose of identification and even further back when the leaders of the ancient Greek city of Sybaris granted the creator of a delicious dish a one-year monopoly on cooking it. With the growth of science and technology, as well as global commerce, a lot has changed since then. Intellectual property is a result of human intellect, and the rights granted to it allow its owner to profit from the benefits of that intellectual endeavour by granting them a monopoly. Such a benefit is not always a natural right, and it must be recognized by law.

In India IPR commenced in 1970. The Patents Act, introduced in 1970; and the followed by the Trade Marks Act, 1999; The Copyright Act, 1957; The Designs Act, 2000; The

Geographical Indications of Goods (Registration & Protection) Act, 1999; The Semiconductor Integrated Circuits Layout Design Act, 2000; The Biological Diversity Act, 2002; The Protection of Plant Varieties and Farmers' Rights Act, 2001 (Khandelwal, 2022).

#### *B. IPR TRENDS*

Intellectual properties protected using the various Act by the government. For that the owners have to apply for the IP registration. The procedure for the registration starts by filing an application in the IP office under CONTROLLER GENERAL OF PATENTS, DESIGN AND trademark (CGDPDTM) coming under government India. CGDPDTM receives, examines the IPR applications and grants them in due course of time.

Initially, the IPR in India focused mainly on patents, designs, and trademarks. But Geographical Indications (GI) Act – 1999 was brought into force on 15th September 2003. Before the TRIPs agreement, GI was not protected in India (Kumari and Reddy, 2006). Similarly, semiconductor IC (integrated circuits) layout design and plant variety and farmers' rights have been protected under the respective acts mentioned. Copyrights are started only in the year 2016-17 only.

Application filed for patents, design, trademark, GI and Copyrights are given below. The data of 2010-2019 is given in the table below. The data shows that large number of applications received in the category of Trademark. Copyrights application filing started from 2016 only. The least number of applications coming under the geographical indicators. From the graph it is evident that every year number of applications filed in each category is in a trend of increasing. Mobile connections and Internet users in India

#### **METHODOLOGY**

The present study is descriptive and analytical in nature. It is based on secondary data which is collected from published document by RBI, NPCI, websites of RBI, Ministry of Finance and other research papers, journals, books, newspapers etc

The paper gives an insight about the IPR registered over the last five years. The source of data used for the study was secondary data. Annual report of Controller General of Patents, Designs & Trademarks (CGPDTM), India ([www.ipindia.nic.in/](http://www.ipindia.nic.in/)) used as the source of collecting the data. The data related to the patents, trademarks, industrial designs

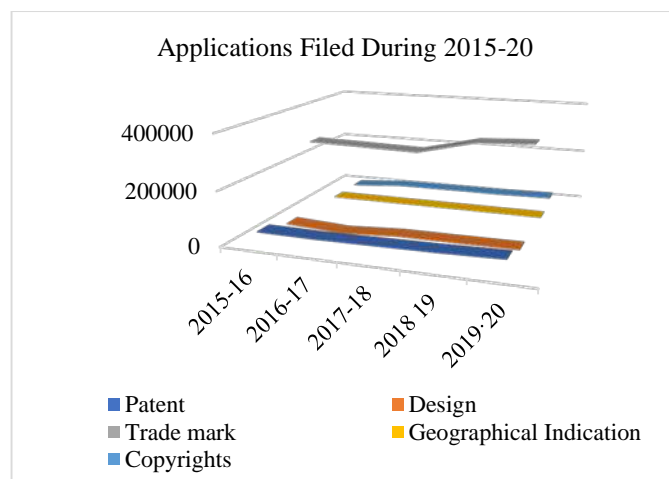
and GI applications filed, examined and granted during the years from 2015-2020 (5 years) are given as a table.

Data on Indian IPR revenue generation were also collected and presented (Table 2) to present the economic value of IP over last 10 years. Besides, data from European Patent Office (EPO) have been considered for evaluation of patent filing and grants in Asia during 2001 to 2012. World Intellectual Property Organization (WIPO) estimates on IP and the ranking of Global Innovation Index (GII) were also considered for this study for pressing the value of Indian research and innovation (Khandelwal, 2022). Also evaluated the corporate social responsibilities of the pharmaceutical companies such as Pfizer and GSK. Both companies are very well known in the industry wise and they introduced the IPR related CSR practices to align with the requirement of WHO.

Year	Patent	Design	TM	GI	CR	Total
2010-11	39400	7589	179317	27	0	226333
2011-12	43197	8373	183588	148	0	235306
2012-13	43674	8337	194216	24	0	246251
2013-14	42951	8533	200005	75	0	251564
2014-15	42763	9327	210501	47	0	262638
2015-16	46904	11108	283060	14	0	341086
2016-17	45444	10213	278170	32	16617	350476
2017-18	47854	11837	272974	38	17841	350544
2018-19	50659	12585	323798	32	18250	405324
2019-20	56267	14290	334805	42	21905	427309

Table 1: 10 years trend in application of Patents, Design, Trademark, GI and Copy Rights

Source: Annual report of CGDPDTM 2019-20



Graph 1: 05 years trend in application of Patents, Design, Trademark, GI and Copy Rights  
 Source: Annual report of CGDPDTM 2019-20

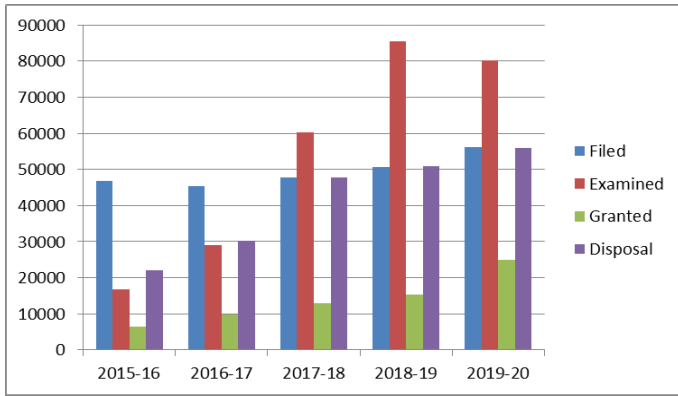
### i. Trends In Patents

A patent is used to prohibit the use, selling, by another party for a defined period of time, of original production. In brief, a sovereign authority awards the inventor the IP right after an examination of its viability (Saha & Bhattacharya, 2011). During the years 2015- 2020, around 2.5 lakh applications filed for granting patents. The table 2 show the status of the patents registered in these 5 years. Smartphone users in India 2013-2025

Year	2015- 16	2016- 17	2017- 18	2018- 19	2019- 20
Filed	46904	45444	47854	50659	56267
Examined	16851	28967	60330	85426	80080
Granted	6326	9047	13045	15203	24936
Disposal	21987	30271	47695	50884	55945

Table 2: Patents filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20



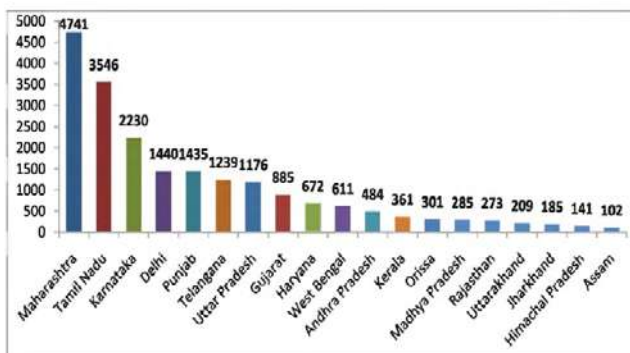
Graph 2: Patents filed, examined and granted during 2015-20

Source: Annual report of CGDPDTM 2019-20

From the table and graph, it was clear that the number of applications filed, examined, granted and disposed in each year was in a trend of increasing. The highest number of applications filed in the 2019-20, that is 56267 applications. There is an increase of 11% in the case of application filing of patents. Application filing happened in these years was mainly in the areas like Biochemistry, Bio medical engineering, bio technology, chemical, communication, computer science etc. (Annual report 2019-20). Patent applications filed by both Indians and Foreigners.

In the year 2019-20, the number of Indian applicants for the patents was 20843. That is the 63% of the total applications were from the foreign applicants. There was a consistent growth in the applications filed for patenting.

State wise applications statistics in the year 2019-20 was given in the chart below.



Graph 3: Patents filed, examined and granted during 2015-20

Source: Annual report of CGDPDTM 2019-20

Maharashtra was the state with highest number of applications (4741) and Tamandu was in the second position (3546). Kerala filed 341 patent applications. The applications were categorized as natural person, Start-ups, small entity and other than natural person. The applications were given by the field of information technology, scientific R & D organizations and academic institutes and universities. The highest number of patents filed by the Indian Institute of technology (664) and from Lovely professional university (442) applied. MESBRO technologies private LTD applied 425 patents from Information and technology. Council of scientific and Industrial research filed 169 cases.

The highest number of foreign applications filed during 2019-20 the Paris Convention was 3637. But there is a decrease of 7% showed compared to the previous year. The top filing country was USA with 8718 filings. Japan and China were in the second and third positions. Huawei technologies Co LTD and QUALCOMM incorporated filed more than 1400 cases.

## ii. Trends In Design Applications

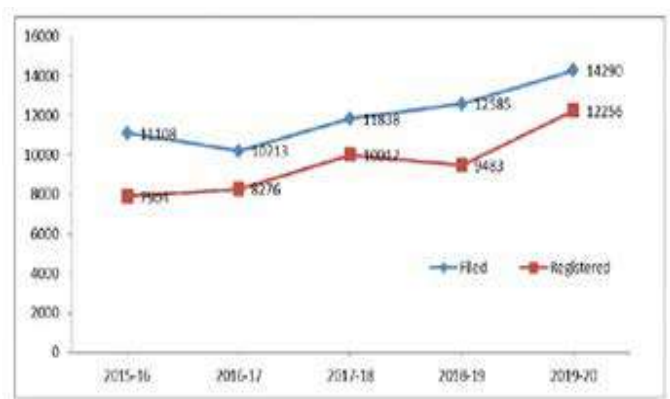
Design applications in India was administrated by Design ACT 2000 and it was amended in the year 2008, 2014. Locarno classification system used for the design registration filing. India is also a member of it. Highest number of applications filed was in the year 2019-20

Year	2015-16	2016-17	2017-18	2018-19	2019-20
Filed	11108	10213	11837	12585	14290
Examined	9426	11940	11850	12661	13642
Registered	7904	8276	10020	9483	12256
Disposal	23	8332	10788	11414	14701

Table 3: Design filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

The trend of applications filed during 2015-20 was represented in graphically as shown in below.



Graph 4: Design filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

Trend shows the increase in the filing and registering of application were increased over the years. Applications from the Indian and Foreign applicants were received during these days. The highest number of applications received from the Maharashtra. Delhi and Gujarat followed by it. Sabyasachi couture filed highest number of applications. USA was the country with highest number of design applications.

### iii. Trends In Trademark

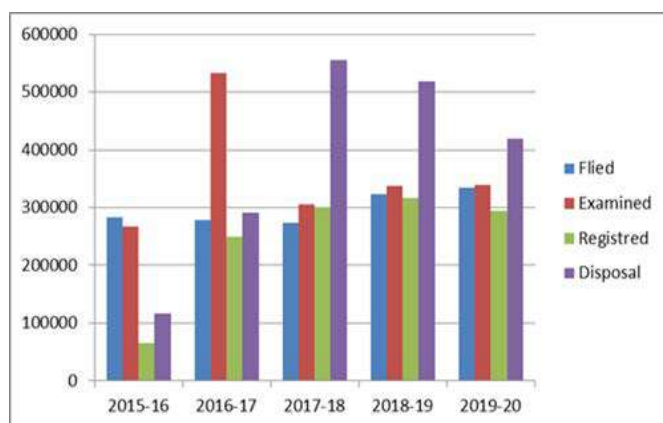
Trade mark registry taking the filing of applications of Trademark under the Trademarks Act 1999. Trademark rule introduced in 2003 and it is replaced as Trademark s Rule in the year 2017. Trademark registration gives protection to the goods and services for the prevention of the fraudulent marks on the merchandise in the country. The head office of the Trademark registrar located in Mumbai.

Year	2015-16	2016-17	2017-18	2018-19	2019-20
Flied	283060	278170	272974	323798	334805
Examined	267861	532230	306259	337541	338551
Registered	65045	250070	300913	316798	294172
Disposal	116167	290444	555777	519185	419566

Table 4: Trademark filed, examined and granted during 2015-20.



Source: Annual report of CGDPDTM 2019-20



Graph 5: Trademark filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

Trademarking increased in 2019-20 compared to the previous years. Foreign and Indian applicants were registered under the trademarking registrar. Maharashtra and Delhi registered more than sixty thousand applications. USA and China were the two countries with highest number of foreign applicants. The highest number of applications came under the medical and pharmaceuticals around 52000. Advertising, Business management and business administrations were coming as second in the list.

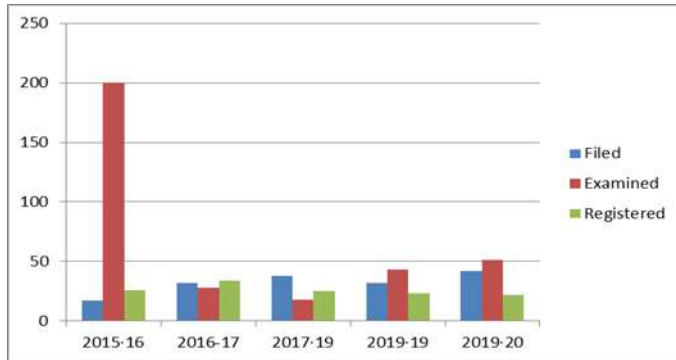
#### iv. Trends In Geographical Indication

Year	2015-16	2016-17	2017-18	2018-19	2019-20
Filed	17	32	38	32	42
Examined	200	28	18	43	51
Registered	26	34	25	23	22

Table 5: Geographical Indication filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

Geographical indicators registry, situated in Chennai helps to monitor the activities coming under the realm of Geographical indicators of goods act, 1999. The main objective of GIR is to register and protect the GIs. GI registration started in the year 2003. Total number of GI applications registered up to 2019-20 was 687. 365 GI registrations were made from the received applications. Karnataka, Tamil Nādu and Maharashtra were the 3 states with highest number of GI registrations. Highest GI applications registered for the agriculture product and the Handcraft including clothing.



Graph 6: Geographical Indication filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

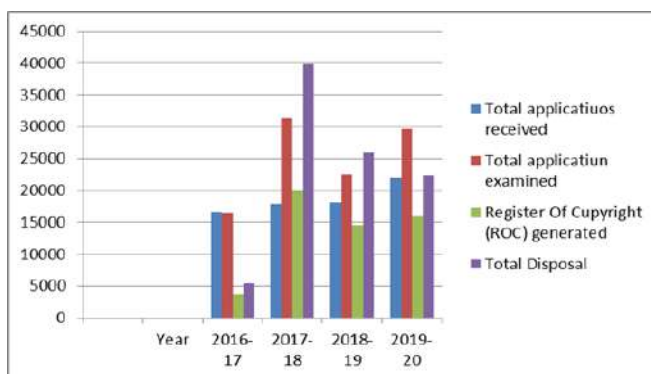
### v. Trends In Copyright Applications

Copyright administration was done by the Copyright act 1957. It says that copy right is the right of an owner of a work to control the uses of work financially benefit from its exploitation. Copy right office is taking care of the application filing, examining and registration. It was established the practice ad procedure manual for the examination of Literary, artistic, musical, sound recording and cinematograph films

Year	Filed	Examined	Registered	Disposal
2015-16	0	0	0	0
2016-17	16617	16564	3596	5444
2017-18	17811	31388	19997	39799
2018-19	18250	22658	14625	25943
2019-20	21905	29670	16029	22516

Table 6: Copyright filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20



Graph 7: Copyright filed, examined and granted during 2015-20.

Source: Annual report of CGDPDTM 2019-20

The number of applications received in each year showing a trend of increasing. From the annual report of the year 2019-20 indicated that the artistic copy rights registered were 4710, literary or drama (9106), computer soft wares (1057) and sound recording (837).

### **Corporate social responsibility (CSR)**

CSR is the idea that businesses should take into account the interests of society by being accountable for how their operations affect customers, employees, shareholders, communities, and the environment.

Organizations are considered as being under a voluntary commitment to go above and beyond the legislative requirement to comply with the law in order to improve the quality of life for employees, their families, local community, and society at large. It concurrently help to value maximization for shareholders as well as stakeholders and build brand differentiation through various methods. So that the organization need to structure a portfolio of IPR and enforcing it can be done in a manner which is socially responsible. But trying to be seen as 'doing no evil' with your IPR can be quite a challenge, as Elon Musk has discovered.

Almost all large corporations have realised over the past couple of decades that it is no longer sufficient to just create value for their shareholders. It is crucial that they are viewed favourably by the markets and cultures in which they conduct business and behave with corporate social responsibility (CSR). Especially pharmaceutical firms are under pressure from corporate social responsibility to share their interests with all of their stakeholders as a kind of social redistribution, not just with their shareholders.

### **Organizations That Promote IPR Through CSR**

The WHO defines essential medicines as those that "are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality, and at a price the individual and the community can afford" and "are intended to satisfy the priority health care needs of the population" (WHO, 2013). The increasing access to current interventions, such as medicines for infectious diseases, maternal and child health, and noncommunicable diseases, would save more than 10.5 million lives by 2015 (WHO 2004), making the human right to essential medicines a derivation of the rights to health and life (Marks,

2009). In particular, and as a result of the AIDS pandemic, the dire need for HIV treatment contributed to the realisation that access to necessary medications, including antiretroviral treatments (ARTs), is a human right. GlaxoSmithKline (GSK), a British multinational pharmaceutical, is the world's second-largest pharmaceutical business and a global leader in the provision of pharmaceuticals invented the medicines for HIV/AIDS, malaria, and tuberculosis, the three most important diseases in the developing world, and to treat them. GSK was the first firm in the sector to tackle the issue of patient access to medications as a strategic consideration, incorporating it not just into its CSR strategy but also into the company's overall strategy. They met with a difficulty in demonstrating how strategically implemented CSR activities may generate both economic and social value.

PFIZER, is one of the world's leading pharmaceutical companies, founded more than 170 years ago. Pfizer Limited is specialise with expert therapy in 4 business categories - Vaccines, Hospitals, Internal Medicine and Inflammation and Immunology. Indians have displayed a spirit of innovation and demonstrated an ability to find creative solutions to emerging challenges. Young researchers and scientists need to harness this innately creative and innovative mindset and the desire to do good, to find solutions to India's pressing healthcare problems. Pfizer has partnered with IIT-Delhi to create a Pfizer IIT Delhi Innovation and IP Program to foster the development of cutting-edge innovations that solve real-life healthcare challenges faced by patients or healthcare professionals. Through this Program, we support incubation and IP filing of start-ups with promising ideas that can truly add value to healthcare delivery in the country. This incubation accelerator initiative is in line with the government's priority of 'Start up India, Stand up India' and is a great example of the merits of academia and industry collaboration. Since its inception in 2015-16, the program has supported 34 innovators through full-time incubations and provided support for IP filings.

### *CONCLUSION*

India is country with abandoned in history, culture and traditional knowledge. Also promote the research and innovation activities in respective sectors and boosting towards the IPR activities. IPR activities start from the filing of the applications. The applications were accepting from the Indian applicants as well as from the foreign applicants. As a result, the total number of applications filed during the year 2015-20 were 18,74,739 and the registered applications were 13,97,871. The highest number of applications in most IPR

is mainly from the Maharashtra. However, from the study it was evident that the increase in the filing of the applications and registering of the patents. This paper also give insights on the topic of the effect of IPR in CSR in pharmaceutical industry. Effective CSR typically requires planning, management, and continuous evaluation because it is an investment in the future of the firm. According to Porter & Kramer (2006), businesses must include a social perspective in their fundamental model used to analyses competition and determine their business strategy. Research and innovation are a business discipline in Indian system which helps to generate sustainable growth and development.

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## **IoT BASED SMART WALKING CANE FOR VISUALLY CHALLENGED**

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### **ABSTRACT**

Blind people face many difficulties to interact with their nearby environment. To provide a tool which will help blind people to navigate as well as sense the obstacles. This is a Walking Stick with in-built ultrasonic sensor with a microcontroller system. The ultrasonic sensor is used to detect obstacles using ultrasonic waves. On sensing obstacles the sensor passes the data to the micro- controller. The microcontroller then processes the data and calculates if obstacle is close enough. If obstacle is not close enough the circuit does nothing. If obstacle is close then microcontroller sends alert signal to the blind person. In addition the route of the blind person is tracked by IoT. The current position of visually challenged person is located by GPS and then uploaded to cloud through Wi-Fi module. Navigation information and instructions is intimated to the user of the Smart walking cane by buzzer. The android application shows the location of the blind person to his family member. In this way, Blind person is guided to move along the path by his family member via the Android Mobile Application. As conclude IoT Based Smart Walking Stick can be a novel system to help blind people to walk easy and reach the required place without any fear.

***Index Terms*—NodeMCU,GPS,ultrasonic sensor,IoT**



## INTRODUCTION

According to the famous philosopher and scientist Aristotle, our knowledge about the outside world depends on five sense organs and sight is one of those five organs. And visually-impaired are those unfortunate people who are completely or partially suffering with eye sight issues. According to the survey of World Health Organization (WHO) and International Agency for Prevention of Blindness (IAPB) approximately 285 million people around the world are visually impaired among which 39 million are completely blind. Blind stick is a special device used by visually disabled people for centuries. But in recent times Electronic Travel Aids (ETAs) with sensors and sound systems are designed for improved navigation of blind people. Here we proposed an advanced blind stick that allows visually challenged people to navigate using advanced technology like ultrasonic sensors and mobile application. We already know about traditional blind sticks. This system can give idea about the surrounding by using GPS system. This project can detect any obstacle with the help of ultrasonic sensors and it can provide correct location of obstacle by using the GPS system. Thus it will help blind people when they are walking outside from their home.

## LITERATURE SURVEY

### *A. Smart walking stick*

Jismi Johnson presents the smart walking Stick helps blind people in moving and allowing them to perform their work easily and comfortably. The blind person cannot recognize what is the size of that object and how far is he from the object. So, it is difficult for blind person to move here and there. The smart walking stick supports Object recognition and output comes mainly in the form of Vosmart walking Stickice output. In Smart Walking Stick, we detect the object with the help of a camera. The stick measures the distance between objects and Smart Walking Stick by Ultrasonic sensor. When the objects or obstacles come in range of the ultrasonic sensor, the speaker tells Name of obstacle in front of the stick. Images will be captured using a camera and the camera is connected to the Raspberry Pi. If any obstacle comes in front of blind person, he can know about the obstacle by hearing the sound generated by the head phone. The smart walking stick is very useful for the visually impaired persons for their safety and freedom from the other persons at all the time. The developed system gives good results in detecting obstacles in front of the user.

### *B. Navigation information via audible messages*

K. Ramarethinam present the project is to provide the navigation information via audible messages and haptic feedback to the visually impaired people helping them to improve their mobility independently. The system with portable self- contained feature that allows the blind people to travel through familiar and unfamiliar environment. The proposed system consists of hardware and software. In this system the Braille capacitive touch screen enables a user-friendly communication with the systems. All the operations can be made with this touch screen. The major components are the GPS receiver and path detector used for receiving the current position and finding the current position and finding the shortest path to the destination. The navigation process of the system will start once the user gives the destination as voice command. The system is provided with an emergency button which will trigger an SMS that will send the present location of the user (GPS Coordinates) to a remote phone number asking for help, in case emergency. In addition, the device provides user information needed, in audio format, including time, calendar, object colour, alarm, obstacle detection, navigation direction, ambient light and temperature conditions. This project will help the blind people in improving their communication ability and notto depend on none during walking in even unknown areas.

### *C. Navigation systems available for visually impaired people*

Kher Chaitrali S presents the visually impaired have to face many challenges in their daily life. The problem gets worse when they travel to an unfamiliar location. Only few of the navigation systems available for visually impaired people can provide dynamic navigation through speech output. In this paper, we propose a navigation device for the visually impaired which is focused on providing voice output for obstacle prevention and navigation using infrared sensors, RFID technology, and android devices. The device has proximity infrared sensors. RFID tags are installed into public building and also integrated into blind person's walking stick. This device is connected to an android phone through Bluetooth. An android application is designed which gives voice navigation based on RFID tags read and also updates persons location information on the server. One more application is designed for family members to access the blind person's location through the server whenever needed. It aims to solve the problems faced by the blind people in their daily life. The system also takes measures to ensure their safety.

#### *D. Visually impaired people to navigate using GPS technology*

Jini.S paper presents the architecture and implementation of a system that will help the visually impaired people to navigate using GPS technology. The system provides artificial guidance to the visually impaired through known paths, that is the path for navigation has to be already stored in the microcontroller. The current latitude and longitude values of the user are obtained using GPS. These values are continuously compared with the already stored value in the microcontroller. Thus, helps the blind in navigation. The goal is to create a portable, simple and less costly system that will allow user to travel through familiar and unfamiliar environments without the aid of guides. Also, it provides voice recognition to detect obstacles. The obstacles are detected using three ultrasonic sensors, which are placed on the left, right, and front positions of the blind. The commands and messages are played back to the blind via APR9600 voice playback IC. The keypad used in system allows the user to select the desired locations to which he/she wishes to go. Keypad consists of 12 keys where each key represents a location. Blind selects the key using Braille language. The paper focuses on the development and evaluation of a Navigation system that makes use of Global Positioning System, voice and ultrasonic sensor for obstacle detection.

#### *E. Blind repetitions for cellular-IoT*

Performance analysis of combination mechanisms as evident from the growing number of technical studies on machine type communications, Internet of Things (IoT) has become a hot topic. Among all the initiatives attempting to build end- to-end connectivity solutions, the 3rd Generation Partnership Project (3GPP) is actively working on the integration of IoT features into the existing 2G and 4G network specifications. In the framework of the adjustment of the GSM (Global System for Mobile communication) and EDGE (Enhanced Data rates for GSM Evolution) systems to IoT applications, several solutions have been proposed at the PHY/MAC level, all sharing a common trait: enhancing the coverage using blind repetition mechanisms. The question of how to recumbent the repeated symbols at the receiver side has then to be raised. In this work, we analyze the performance of state- of-the-art combination approaches that are carried out at different levels of a classic GSM receiver and we propose a new combination scheme. To mitigate the drawbacks of each individual solution, two hybrid strategies are proposed involving these different levels of combination. Performance comparison is led for the different cases considering constant as well as time variant channels, leading to a discussion about the most efficient strategy to follow, depending on the targeted application. To the best of our knowledge, this is the

first work dealing with the comparison of combination mechanisms including hybrid combining solutions. Internet of Things in Eye Diseases: Introducing a New Smart Eyeglasses Designed for Probable Dangerous Pressure Changes in Human Eyes Internet connects all the people together, whereas the Internet of Things (IoT) connects all the tools together. Internet of Things is a technology in the health sector with a variety of applications. In this article we consider one of the IoT applications in ophthalmology. The optic nerve disorder and lack of blood supply to the eye can cause vascular disorders of vision and a slight blur to complete blind eye sight to be followed. In this paper, using the Internet of Things technology for eyeglasses design that can help as a doctor. The eye glasses can transmit the signals of the eye blood flow sensor and lens color and see the bleeding in the eyes; sending messages to the patient, physician and the emergency contacts as well as informing the hospital emergency GPS and friends/families of patient to be aware of the exact location of the patient.

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## METHODOLOGY

### A. Functional block diagram

The Smart walking system ultrasonic Sensors are kept at a heights to recognize obstacles at different positions. The Ultrasonic sensors are kept at heights of 40 cm to recognize the obstacles of different heights. Specially programmed text to voice converter informs the obstacle information to the user through stereophonic headphone. The frequency at which the buzzer buzzes alerts the visually challenged regarding the obstacle distance and make the people around the user of the smart walking cane realize that visually challenged is around them. Motion sensor senses the movement of any vehicle in the sensing region and informs the user of the same. The Vibratory circuit is used to assist deaf people in navigation. The GPS Module senses the current location of the user and the Wi-Fi Module transmits the current location to the cloud, where the user navigation history can be tracked. All the abovementioned functionalities are

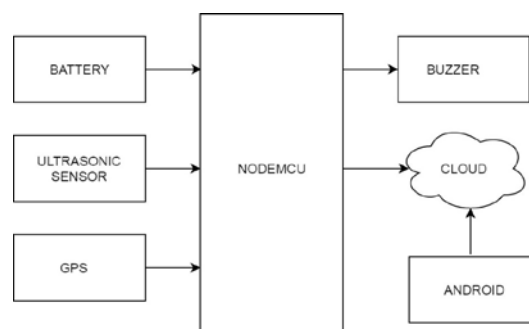


Fig. 1. Block diagram

*Obstacle detection:* Cryptography is a method of defensive facts and communications

through the usage of codes, so that only those for whom the information is intended can read and process it. In computer science, cryptography refers to comfy data and conversation techniques derived from mathematical concepts and a fixed of rule based calculations called algorithms, to transform messages in ways which might be difficult to decipher. These deterministic algorithms are used for cryptographic key technology, digital signing, verification to defend data privateness, web surfing at the internet and private communications which includes credit card transactions and email.

*GPS tracker:* Position Identification and upload to Cloud Smart walking cane not only support the visually challenged in navigation but also in detection of the current location and it updates the location to cloud. It is of ultimate importance to know about the current position of a person. In order to solve this challenge Global Positioning System (GPS) is used. The current position along with current time can be found using GPS which triangulates the GPS data received from three or more satellites. The data provided by GPS is processed by microcontroller.

*B. Flow chart*

The system checks its status and if it is ON then it checks the object in front of ultrasonic sensor. If object is detected buzzer will be ON. The GPS will load latitude and longitude to cloud .Using this data path is tracked in android by using blynk application.

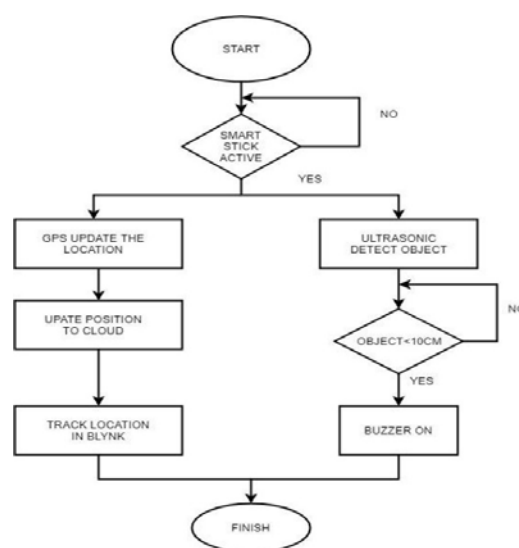


Fig. 2. Flow chart

## HARDWARE AND SOFTWARE REQUIREMENTS

### A. Hardware details

1) *NodeMCU*: The ESP8266 is a low-cost Wi-Fi chip with full TCP/IP stack and MCU (Microcontroller unit) capability produced by Shanghai-based Chinese manufacturer Espressif systems. The chip set came to the attention of western makers in August 2014 with the ESP01 module, made by a third-party manufacturer, AI-Thinker. This small module allows micro-controllers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at the time there was almost no English language documentation on the chip and the commands it accepted. The very low price and the fact that there were very few external components on the module which suggests that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation. The ESP8285 is an ESP8266 with 1MB of built-in flash allowing for single-chip devices capable of connecting to Wi-Fi.

2) *Ultrasonic sensor*: HC-SR04 distance sensor is commonly used with both microcontroller and micro-processor platforms like Arduino, ARM, PIC, Raspberry Pi etc. The following guide is universal since it has to be followed irrespective of the type of computational device used. Power the sensor using a regulated +5V through the Vcc and Ground pins of the sensor. The current consumed by the sensor is less than 15mA and hence can be directly powered by the on-board 5V pins (if available). The Trigger and the Echo pins are both I/O pins and hence they can be connected to I/O pins of the microcontroller. To start the measurement, the trigger pin has to be made high for 10µs and then turned off. This action will trigger an ultrasonic wave at a frequency of 40kHz from the transmitter and the receiver will wait for the wave to return. Once the wave is returned after it getting reflected by any object the Echo pin goes high for a particular amount of time which will be equal to the time taken for the wave to return back to the sensor.

3) *GPS*: This is a complete GPS module that is based on the Ublox NEO-6M. This unit uses the latest technology from Ublox to give the best possible positioning information and includes a larger built-in 25 x 25mm active GPS antenna with a UART TTL socket. A battery is also included so that you can obtain a GPS lock faster. This is an updated GPS module that can be used with Ardupilot Mega v2. This GPS module gives the best possible position information, allowing for better performance with your Ardupilot or other Multirotor control platform. The Ublox NEO-6M GPS engine on this board is a quite good



one, with the high precision binary output. It has also high sensitivity for indoor applications. UBLOX NEO-6M GPS Module has a battery for power backup and EEPROM for storing configuration settings. The antenna is connected to the module through a ufl cable which allows for flexibility in mounting the GPS such that the antenna will always see the sky for best performance. This makes it powerful to use with cars and other mobile applications. The Ublox GPS module has serial TTL output, it has four pins: TX, RX, VCC, and GND.

## B. SOFTWARE DETAILS

1) *Arduino IDE*: The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom right hand corner of the window displays board and serial port. The toolbar buttons allow to verify and upload programs, create, open, and save sketches, and open the serial monitor.

2) *Blynk*: Different types of EEG sensors are available nowadays. EEG artifacts are the main problem when dealing with EEG sensors. An artifact free and educational/research purpose unit for EEG fetching (Neurosky headset) that is available in the common market is used here. The details are discussed below. Blynk is an Internet of Things Platform aimed to simplify building mobile and web applications for the Internet of Things. Easily connect 400+ hardware models like Arduino, ESP8266, ESP32, Raspberry pi. Blynk Server is an Open-Source based Java server, responsible for forwarding messages between Blynk mobile application and various microcontroller boards and SBCs (i.e. Arduino, Raspberry Pi. According to Blynk's website, Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet. It is a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets.”

## CONCLUSION

The program code was written by using Arduino IDE. The buzzer will activate if the distance is less than 10cm from the obstacle. The simulation results are expected for the ultrasonic sensors, and for integrated GPS in one nodeMCU board. However, this system having the delay while detecting the obstacles between 2 to 4 second. The delay for the GPS to get the location for the stick is around 30 seconds to One minute. In addition to that, GPS system cannot be used for indoor because of the GPS signal will be too weak. Many features are used to develop our project to help the visually impaired people. The proposed system is economical and efficient in comparison with the similar system developed so far.

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## **A REVIEW ON IMAGE SEGMENTATION**

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### **ABSTRACT**

Image segmentation is the process of grouping diverse components within an image. This can be done in conjunction with the numerous object classes that are present in the provided image. With the aid of manual segmentation masks, object segmentation takes a lot of time; therefore, a collaboration between a machine segmentation model and human annotator is used to make it more effective and efficient. Image segmentation can be done more easily by pixel level predictions. This prediction method is done because an image will be classified according to a particular type of category. This paper gives the survey of image segmentation using different types of algorithms and techniques.

### **INTRODUCTION**

In the developing world computer vision has a very big hand, years going on the usage of the computer power will increase and increase this will lead to a dramatic growth in the computer vision task. Now the computer is very cheap and has a greater availability hence the number of human annotators manually remains high so many new methods are to be introduced to boost up human annotators. The traditional image understanding task and image segmentation are very costly for annotation. For each and every object instants within

an image containing in different classes it needs annotating masks for indicating that which pixel belongs to a particular instant.

Image segmentation means partitioning a single image into a number of multiple segments. The main goal of image segmentation is that for the best and easy understanding of an image simplify the representation of an image. The first detection was done by Roberts's edge detector among 40 years before. Segmentation algorithms are a Janus-faced with several difficulties; native structures of pictures like flat regions and limits are appeared differently; image segmentation may be a low level method in image analysis, so, segmentation algorithms partition pictures victimization low level ideas of pictures like picture element intensity, picture element color, texture and etc. Another issue is the lack of correct criteria for evaluating segmentation algorithms. In this paper, a segmentation methodology is taken into account economical if have these features: Continuity of contours, applicable number of segments, free from any thresholding worth, resistance against noise, low time quality, usefulness presentation of results for higher level of image analysis, and eventually every detected phase needs to be homogeneous and has uniform structure and adjacent segments ought to have sharp distinction (Color, intensity, texture, etc). Satisfying higher than options causes generality of a segmentation methodology, therefore this segmentation methodology are often utilized in variety of applications. The contribution of this paper is to propose a completely unique evolution primarily based segmentation algorithms rule that satisfies higher than options. This methodologies is galvanized from a natural behavior of human teams that square measure unfold through a topographic plane and willing to own a social life. Digital image process has several recent applications in the fields of remote sensing, medicine, photography, film and video production security observance. New innovative technologies are rising in the fields of image process particularly in the image segmentation domain.

## **SEGMENTATION ALGORITHMS**

Segmentation Algorithms are developed to phase the images they are supported by the 2 basic properties, separation and similarity. In separation based mostly partition associate degree subdivision is applied supported abrupt changes in intensity levels or gray levels of an image. In this methodology our interest primarily focuses on identification of isolated points, lines and edges. In similarity based mostly cluster those pixels that square measure similar in some sense, it includes approaches like thresholding, region growing, and region

cacophonous and merging.

## **CLASSIFICATION OF SEGMENTATION TECHNIQUES**

- Segmentation by Edge Detection
- Segmentation by Thresholding
- Segmentation by Region based
- Segmentation by Feature based Clustering

These are the different types of image segmentation techniques used.

## **LITERATURE SURVEY**

Amarpreet kaur has projected image segmentation because the one that divides the image into multiple elements within the type of picture element. To notice the thing boundaries and different relevant knowledge segmentation is employed.

Vrushali mendhule has projected the study of various technologies of interactive image segmentation for image of foreground background separation system. Technologies that area unit used for interactive image segmentation area unit intelligent scissors, reconciling GMMRF model, probabilistic hyper graphs, interactive graph cut methodology.

Tao Wang in line with image segmentation area unit approached by segmentation drawback that is developed in a probabilistic manner. Here the author live similarities between picture element pairs and seed pairs to boost the hardness to the seeds. By imposing smoothing constraints on single potential the work is projected to mix the region and boundary info of the image.

Wenxian principle projected the answer of the utilization of multiple intuitive user inputs to beat the weakness of the interactive image segmentation algorithmic program that lacks in understanding the intention of user inputs. The 3 sorts of user inputs area unit foreground and background seed input, soft constraint input and laborious constraint input.

B Bhanu presents the user chosen set of examples and counter examples regarding the particular segmentation drawback of image segmentation. The genetic algorithmic rule and

special combination of assortment of discriminating operations guides the image segmentation related to image options.

Nida M. Zaitoun many rules and techniques are developed for image segmentation. Since there's no answer for the image segmentation drawback, the technique has been combined with domain information. Presents the study of basic block primarily based image segmentation technique.

Bibhas Chandra Dhara explains quick and easy interactive image segmentation techniques in 2 modules. In first, the first image is pre-segmented by an occasional level segmentation methodology. Second, some portion of the image is marked. These 2 strategies identify all similar coloured objects within the image.

Jifeng Ning a vital task in pc vision and beholding is economical and effective image segmentation. Interactive schemes with a number of easy user inputs are sensible solutions since totally automatic image segmentation is typically terribly laborious for natural pictures. Presents the new region merging based mostly interactive image segmentation technique.

## **DIFFERENT SEGMENTATION TECHNIQUE**

There are many types of segmentation techniques are explained below.

### **1. Segmentation by Edge Detection**

In the image segmentation method, the essential step is edge detection. It divides a picture into an object and its background. Edge detection divides the image by perceptive the modification in intensity or pixels of a picture.

Different types of edge detection types (fig:1) are.

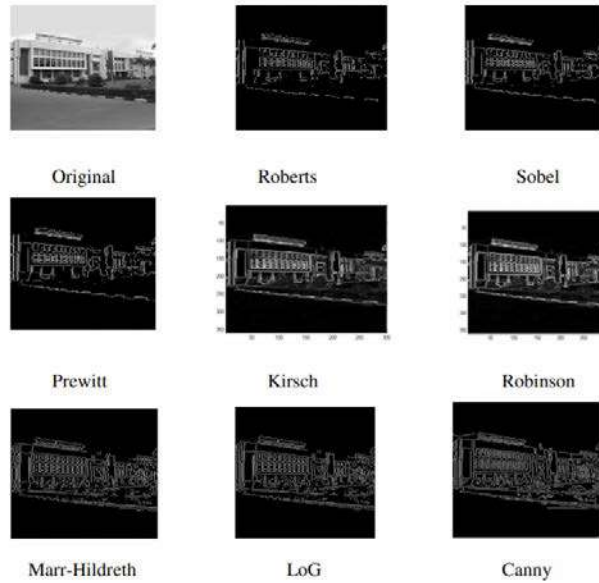
- Roberts Edge Detection
- Sobel Edge Detection
- Prewitt Edge Detection
- Kirsch Edge detection

- Robinson Edge detection
- Marr-Hildreth Edge Detection
- LoG edge detection
- Canny Edge Detection

Grey bar graph and Gradient are 2 main ways for police investigation edge detections in image segmentation. Edge detection operators are divided into 2 classes as initial order by-product operators and second order by-product operators. Second order operators provide reliable results. The cagey edge detector may be a second by-product operator. Almost no zero-value pixels square measure gift in a foothold image, however tiny edge values correspond to non-significant grey level changes ensuing from division noise, tiny lighting irregularities. Selection of associate degree applicable international threshold is usually troublesome and generally impossible p-tile thresholding may be applied to outline a threshold or else, non-maximal suppression and physical phenomenon thresholding may be used as was introduced within the cagey edge detector. Initially a picture is taken and it's to phase exploitation cagey edge detection technique. For this 1st the image is reborn from rgb to grey. The primary step is to filter out any noise in the original image before attempting to find and sight any edges.

The Gaussian filter is employed in cagey rule it is computed employing an easy mask when smoothing the image and eliminating the noise a successive step is to seek out the edge strength by taking the gradient of the image. Then the approximate absolute gradient magnitude edge strength at every purpose is found by estimating the gradient within the x-direction columns and the different estimating the gradient within the y-direction rows. Finding the edge strength, edge direction exploitation the gradient of x and y directions is to be found. Non most suppression is employed to trace on the sting in the edge direction and suppress any element worth sets it equal to zero that is not thought-about to be a grip. this can provides a skinny line within the output image. physical phenomenon is employed as a means of eliminating streaking. Streaking is the calling it quits of a grip contour caused by the operator output unsteady on top of and below the threshold. To avoid edges appearing as if in a dotted line, physical phenomenon uses 2 thresholds, a high and a low. so a picture is divided exploitation edge detection.





**fig 1 : Original Image with the result of various edge detection techniques**

## 2. Segmentation by Thresholding

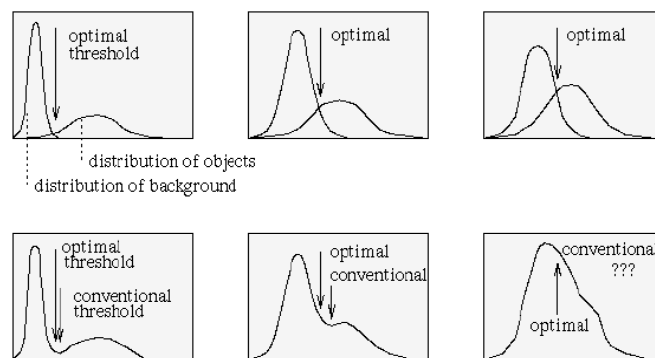
Image thresholding classifies pixels into 2 classes one is those that some property measured from the image falls below a threshold, and people at that the property equals or exceeds a threshold. Thresholding creates a binary image by binarization.

Different types of threshold algorithms are explained below.

- P-tile thresholding
- Optimal thresholding
- Mixture modelling
- Adaptive thresholding

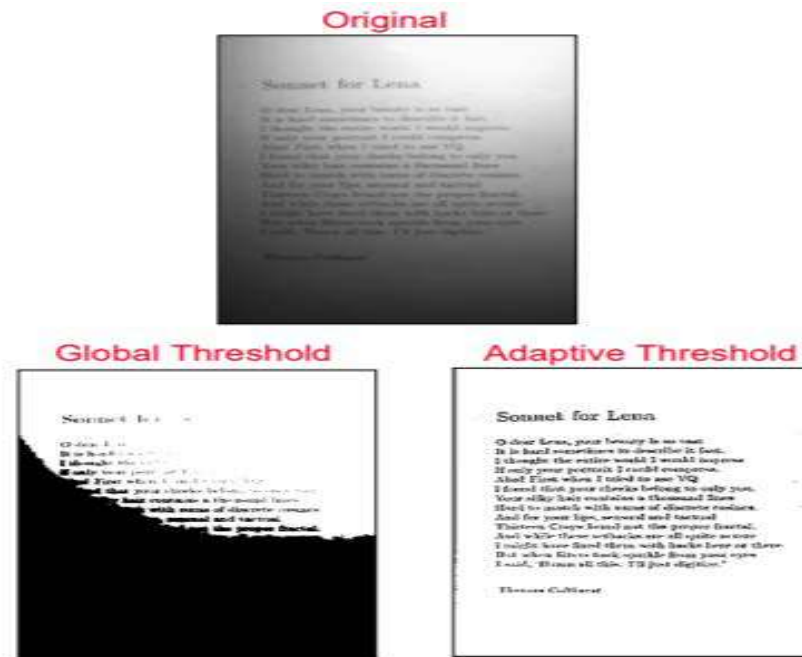
The p-tile technique uses data regarding the world size of the required object to the brink a picture. The P-tile technique is one in all the earliest threshold strategies primarily based on the grey level bar chart . It assumes the objects in a picture square measure brighter than the background, and occupy a set share of the picture space. This fastened share of image space is additionally called pc the brink is outlined because the grey level that principally corresponds to mapping a minimum of packed with the grey level into the item. Idea of the optimal threshold segmentation is that the histogram of an image is the sum of two

overlapping distributions. Optimal threshold is overlapping point of these distributions corresponding to the minimum probability between the maxima of 2 distributions. The important problems is that the distributions are unknown. There is iterative optimal threshold selection. Optimal thresholding strategies choose the brink supported the step-down of a criterion perform. The criterion for Otsu is that the step-down of the within-group variance of the 2 teams of pixels separated by the brink. The figure below shows the comparison of optimal threshold detection and convolutional threshold detection.



**Fig 2: Comparison between conventional and optimal thresholding**

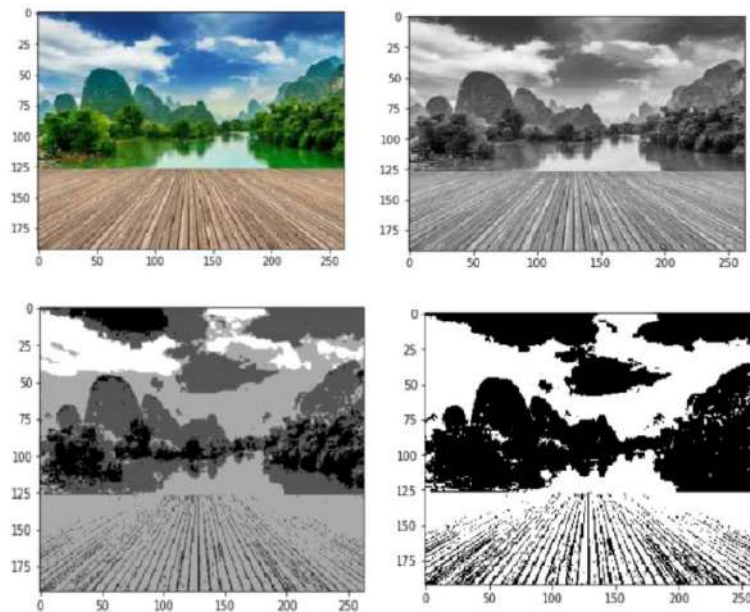
Mixture model is that region intensities are each normal distributions known as Gaussian distributions. Each of the Gaussian distributions has a mean and standard deviation independent of the threshold that we choose. Adaptive thresholding generally takes a grayscale or color image as input and, within the simplest implementation, outputs a binary image representing the segmentation. For every pixel within the image, a threshold has got to be calculated. If the pixel value is below the edge it's set to the background value, otherwise it assumes the foreground value. There are 2 main approaches to finding the threshold: (i) the Chow and Kaneko approach and (ii) native thresholding. The idea behind each way is that smaller image regions are a lot of seemingly to own just about uniform illumination, so being a lot of appropriate for thresholding. Chow associated Kaneko divide a picture into an array of overlapping subimages and so realize the optimum threshold for every subimage by investigation its bar graph. The edge for every single pixel is found by interpolating the results of the subimages. The downside of this methodology is that it's a big-ticket machine and, therefore, isn't acceptable for time period applications. An alternative approach to finding the native threshold is to statistically examine the intensity values of the native neighborhood of every pixel. The data point that is most acceptable depends for most part on the input image.



**fig 3: Adaptive thresholding a example work**

### 3. Segmentation by Region based

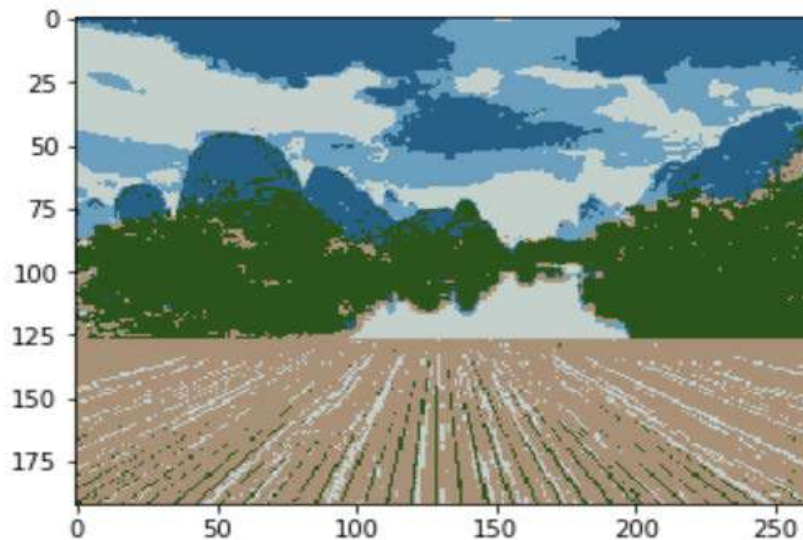
One easy thanks to phase completely different objects might be to use their pel values. A crucial purpose to notice – the pel values are completely different for the objects and therefore the image’s background if there’s a pointy distinction between them. During this case, we are able to set a threshold price. The pel values falling below or on top of that threshold may be classified consequently as Associate in Nursing object or the background this method is understood as Threshold Segmentation. If we would like to divide the image into 2 regions as object and background we tend to outline one threshold price this is often called the worldwide threshold. If the multiple objects alongside the background it should outline multiple thresholds these thresholds square measure put together called the native threshold. Region growing may be a procedure that teams pixels or subregions into larger regions. the only of those approaches is pel aggregation, that starts with a group of seed points and from these grows regions by appending to every seed points those neighboring pixels that have similar properties like grey level, texture, color, shape. Region growing based mostly techniques square measure higher than the edge-based techniques in clamant pictures wherever edges square measure troublesome to notice.



**fig 4:region based image segmentation**

#### 4. Segmentation by Feature based Clustering

Clustering is that the task of dividing the population information points into variety of teams, specified information points within the same teams area unit additional kind of like alternative information points therein same cluster than those in alternative teams these teams area unit referred to as clusters. Texture segmentation spatial localization of the various textures that area unit gift in a picture doesn't imply texture recognition. The textures don't have to be compelled to be structurally completely different apparent edges don't correspond to a separation within the luminousness operate texture segmentation. K suggests that and mean shift area unit 2 differing kinds used for bunch . significantly, K-means bunch algorithms and fuzzy c-means bunch algorithms area unit the 2 standard samples of the progressive bunch strategies. These strategies area unit ready to generate a partition of pictures below some conditions together with giving the cluster range previous. However, the performance of segmentation is sensitive to cluster centers and numbers, that area unit very troublesome to be known directly and previous by human beings. Clustering methodology is one in all the foremost common rule in image segmentation domain. it's associate degree approach of classifying patterns or information into classes, that is on the premise of the samples within the same cluster have the upper similarity than those in numerous groups.



## CONCLUSION

This paper gives a survey of segmentation approaches for pictures. And the summary of segmentation methodologies applied for digital image process is explained in short. This techniques mentioned in this review paper square measure used in several advanced mission for identification of regions pictures or object.

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**EMPLOYEES' ORGANIZATIONAL CITIZENSHIP BEHAVIOURS  
FOR THE ENVIRONMENT, EMPLOYEES' ENVIRONMENTAL  
VALUES AND PERCEIVED BEHAVIORAL CONTROL - THE  
JOURNEY TOWARDS SUSTAINABILITY IN INDIAN HOTEL  
INDUSTRY**

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**Employees' Organizational Citizenship Behaviours for the Environment, Employees' Environmental Values and Perceived Behavioral Control - The Journey towards Sustainability in Indian Hotel Industry**

**Mercy Tom & Dr.Zakkariya K.A**

**ABSTRACT**

Environmental impact of the hotel industry has been quite astounding, making it imperative for every hotel to show genuine commitment towards minimizing their environmental



footprint. Organizational citizenship behaviours for the environment (OCBEs) can play a pivotal role in improving the environmental performance of the hotel industry. This study explores employee OCBEs in the Indian hotel industry by proposing a theoretical model that hypothesizes the relationship between employees' environmental values, perceived behavioral control (PBC) and OCBEs. The study reveals the positive relationship between employees' environmental values and perceived behavioral control (PBC) from a survey conducted among 285 employees from four premium eco-friendly hotels in India. It also proves the mediating role of perceived behavioral control in the relationship between employees' environmental values and OCBEs.

**Keywords: employees' organizational citizenship behaviours for the environment (OCBEs), employees' environmental values, perceived behavioral control (PBC)**

## **INTRODUCTION**

The origins of environmental sustainability in hotel industry can be traced back to the 1960s, suggesting that there has been increased awareness among the hotel management regarding the environmental impacts of the hotel's business operations" (Goldstein & Primlani, 2012). As the hotel sector is accountable for significant amounts of resource consumption (water and energy), it is inevitable for the sector to reduce its carbon footprint (Chande & Garge, 2017). The hotel industry has huge potential of adopting eco-friendly practices in innovative ways.

In India, environmental sustainability has gained impetus with the inception of The Orchid Hotel, Mumbai, the first ecotel hotel in Asia and ever since, there has been a surge in the number of eco-friendly hotels (Fukey & Issac, 2014). The successful implementation of hotel's eco-friendly practices depends not only on the green stance of the management towards environmental issues but also on its employees' active participation in the hotel's vision on environmental sustainability (Ramus & Killmer, 2007). In this context, there is a need to study about employees' organizational citizenship behaviours towards the environment (OCBEs). Boiral (2009) analyze the employees' organizational citizenship behaviours for the environment as a form of Organizational citizenship behavior (OCB). define OCBEs as "individual and discretionary social behaviours that are not explicitly recognized by the formal reward system and that contribute to a more effective environmental management by organizations" (Boiral & Paille, 2012). OCBEs are a proxy for eco-innovation and contribute to corporate greening (Ramus & Steger, 2000).

Ramus (2002) claims that employees who perform eco-friendly behaviours may be influenced by organizational and individual factors. Studies encompassing the employees' psychological factors in the area of OCBEs in hotel sector is very scant and the limited research in this domain have been conducted only in manufacturing, chemical and retail sectors (Ramus & Steger, 2000; Stritch & Christensen, 2014). This study addresses this research lacuna by examining the role of employees' psychological traits namely employees' environmental values and perceived behavioral control (PBC) in determining employees' OCBEs. The objectives of this study are to examine the relationship between employees' environmental values and perceived behavioral control (PBC) as well as to find out whether perceived behavioral control (PBC) of hotel employees mediates the relationship between employees' environmental values and OCBEs. The following section discusses in detail the employees' psychological factors namely employees' environmental values and perceived behavioral control and hypotheses are formulated. The section thereafter presents the research methodology and results of data analysis. It is followed by discussion, contributions of the study and managerial implications. The paper concludes by mentioning the study's limitations and suggesting avenues for future research.

## **THEORETICAL BACKGROUND AND HYPOTHESES**

### **Employees' OCBEs**

OCBEs are pro-social, discretionary and extra-role behaviors (Ramus & Killmer, 2007 which contribute to the effective implementation of organization's environmental management practices (Boiral, 2009). Boiral and Paille (2012) developed and validated the scale for the measurement of OCBEs. Their study also identified the three main types of OCBEs. The OCBEs classed as eco-initiatives can be defined as discretionary behaviours or suggestions that are not recognized by the formal reward system and that cumulatively help to improve the organization's environmental practices or performance. OCBEs classed as eco-civic engagement were defined as voluntary and unrewarded participation in environmental activities (events, initiatives or projects) that have been instituted by the organization and that contribute to improving its image or practices. The OCBEs classed as eco-helping were defined as voluntary and unrewarded behaviours aimed at helping colleagues to better integrate environmental concerns in the workplace (Boiral & Paille, 2012).

## **Employees' Environmental Values**

As per Schwartz and Bilsky (1987), values are concepts or beliefs about desirable end states or behaviors that transcend specific situations, guide selection or evaluation of behavior and events and are ordered by relative importance. In this study, values are measured using Schwartz,1992.

Schwartz (1992) has identified 10 value types arranged into four clusters reflecting two dimensions - universalism and benevolence are the sub value types of the self-transcendence value orientation whereas power, achievement and hedonism form the sub value types of self-enhancement value orientation (Schultz & Zelezny,1999; Schultz,2001).Universalism represents altruism towards mankind whereas benevolence denotes altruism towards kith and kin (Schwartz,1992). The second dimension is openness to change versus conservatism. Tradition, security and conformity are the sub value types of conservatism The study by Schwartz (1994) found that universalism and benevolence are positively related to pro-environmental behavior while self-enhancement comprising of power and achievement is negatively related to pro-environmental behavior. Numerous studies support this finding (Schultz & Zelezny, 1999; Schultz, 2001). The study by Chun (2009) reveals that employees who give importance to conservatism (tradition, security and conformity) commit themselves more to pro-environmental behaviours.

The study by Zientera and Zamojska (2018) among hotel employees in Poland found that employees' environmental values are positively related to their engagement in OCBEs. Boiral and Paille (2015) found that environmental values are positively related to manager's OCBEs.

## **Perceived Behavioral Control**

Perceived behavioral control is the person's belief as to how easy or difficult; performance of the behavior is likely to be (Ajzen & Madden, 1986). PBC is explicated by internal and external sources of control (Hornik et.al,1995). Internal sources of control represent a person's knowledge, skills and abilities whereas external sources of control denote perceived aids or hindrances in the work environment like available facilities, time or support from colleagues and supervisors (Kraft, Rise, Sutton & Roysamb,2005). The more resources and opportunities individuals think they have, and the fewer obstacles they anticipate, the greater should be their perceived control over the behavior (Ajzen & Madden, 1986).

## **Employees' Environmental Values & Perceived Behavioral Control**

The study by Yadav, Balaji & Jebarajakirthy (2018) proves that biospheric values positively influence travelers' perceived behavioral control associated with green hotels. There is a research lacuna in the relationship between employees' environmental values and employees' perceived behavioral control to perform OCBs. Hence, we hypothesize that

Hypothesis 1: Employees' environmental values are positively related to their perceived behavioral control.

## **Mediating Role of PBC**

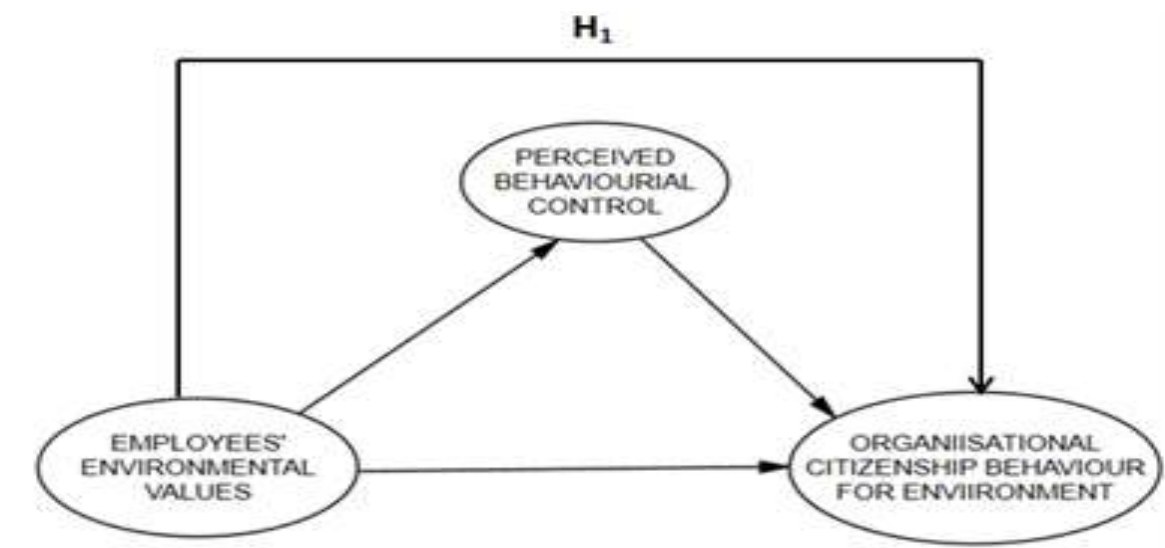
The study by Sanchez, Mosquera, Lopez and Faulin (2018) found the mediating role of perceived behavioral control in the relationship between biospheric, egoistic and altruistic values and residents' willingness to pay to reduce noise pollution. Also, Chuang, Chen and Chen (2018) proved the mediating effect of PBC in the relationship between sustainability values and travelers' pro-environmental behavioral intention to stay in green hotels. However, the mediating role of perceived behavioral control in the relationship between employees' environmental values and OCBs is unexplored till date. This research lacuna provides us the basis of following hypothesis:

Hypothesis 2: Perceived behavioral control mediates the relationship between employees' environmental values and OCBs.

## **Perceived behavioral control and OCBs**

PBC has been used in various studies on environmental psychology to take into account the constraints like lack of time and money, poor supervisor support etc which hinder the employees' environmental performance (Moisander, 2007). The reason behind PBC is assumed to performing be a determinant of OCBs are related to the time constraints and complexity encountered by employees in performing OCBs. Certain environmental aspects are quite technical and employees require the competency and resources to implement OCBs except for simple eco-friendly behaviours (Boiral et.al, 2013). The study by Yuriev and Boiral (2020) established that PBC positively predict the intention of employees to engage in OCBs. Boiral, Talbot and Paille (2015) proved that PBC is positively related to managers' OCBs.

On the basis of review of literature, a theoretical model is formulated as depicted in Figure 1.



**Figure 1: Theoretical Model**

## **Method**

Indian hotels implementing eco-friendly practices constitute the sample of the study. The research design is descriptive research. The sample of the study comprises employees working in four eco-friendly premium Indian hotels with strong environmental policy. The survey was conducted online via google forms and offline by administering hard copies of questionnaires to the employees. Altogether 285 completely filled questionnaires are received and subjected to analysis.

## **Measurement of Constructs**

OCBEs were measured using a ten-item scale that was originally developed by Boiral and Paille (2012) and its reliability was found to be 0.92. Based on the objectives of the study, survey Employees' environmental values re measured by Schwartz (1992). Perceived behavioral control is measured by 3-items by Boiral, Talbot and Paille (2015) adapted from the scale developed by Cordano and Frieze (2000) having reliability of 0.95. The respondents reported their level of agreement or disagreement to the statements representing the variables on a 5-point Likert type scale.

## **Descriptive Statistics**

In depicting the sample respondents' characteristics, 52% are males while females constitute

48%. Most of the employees (64.3%) possess 2 -5 years of work experience followed by 22.8% having 5 -10 years of experience whereas only 12.9% have more than10 years of work experience in the current organization. 42% of the respondents are chefs working in F&B Production, 18.5% are engineers, 30.5% of respondents are stewards working in F&B Service followed by 9% respondents are housekeeping employees.

### Data Analysis and Results

Confirmatory factor analysis (CFA) is used to validate the hypothesized measurement model as shown in Figure1. We used AMOS and the maximum likelihood method of estimation. Composite reliability (CR) is assessed using confirmatory factor analysis models with the maximum likelihood method. It can be inferred from Table 1 that majority of the items demonstrated a loading greater than 0.7 clearly validating the convergence. Convergent validity is measured using average variance extracted (AVE) and AVE of 0.50 or higher is acceptable and from Table 1, it can be interpreted that all three variables have AVE greater than 0.5. This indicates adequate convergent validity. As mentioned in Table 2, the measurement model provided a good fit to the data ( $\chi^2/df = 1.92$ , GFI = 0.892, RMSEA = 0.083, CFI = 0.893; NFI = 0.872). Discriminant Validity results are depicted in Table 3 .These results establish the convergent and discriminant validity of the data.

**Table 1. Psychometric properties**

<b>Constructs</b>	<b>Composite Reliability</b>	
<b>Average variance extracted</b>		
Employees' environmental values	0.934	0.587
Perceived behavioral control	0.846	0.650
Employee OCBEs	0.918	0.531

Note: CR - Composite Reliability, CA - Cronbach Alpha, AVE – Average Variance Explained

**Table 2. Goodness of Fit Indices**

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**Goodness of Fit Indices**

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$\chi^2/df$	<b>1.920</b>
<b>GFI</b>	<b>0.892</b>
<b>RMSEA</b>	<b>0.083</b>
<b>AGFI</b>	<b>0.887</b>
<b>NFI</b>	<b>0.872</b>
<b>CFI</b>	<b>0.893</b>
<b>IFI</b>	<b>0.885</b>
<b>RFI</b>	<b>0.891</b>
<b>PCFI</b>	<b>0.797</b>
<b>PNFI</b>	<b>0.695</b>

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Abbreviations:  $\chi^2$ , chi-square; df, degree of freedom; GFI, goodness of fit index; RMSEA, root mean square error of approximation., NFI, normed fit index; CFI, comparative fit index.

**Table 3. Discriminant Validity of the Measurement Model**

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	Employees' Environmental values	Perceived behavioural control
OCBEs		
Employees' environmental values	<b>0.766*</b>	
Perceived behavioural control	0.615	<b>0.806*</b>
OCBEs	0.405	0.474

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**0.729\***

\* *Square Root of AVE values*

**Testing Relationships among the Variables**

Hypothesis 1 presumed a significant positive relationship between Employees' environmental values and perceived behavioral control. The results prove hypothesis1 as the regression coefficient of direct effect from employees' environmental values to PBC is 0.510. This is

found to be statistically significant (  $p = 0.006$ ,  $p < 0.05$ ). Hypothesis 2 implied testing mediation. We tested the mediation effect by directly assessing whether the indirect effect of employees' environmental values on OCBs through perceived behavioral control is significantly different from zero (Preacher, Rucker & Hayes, 2007). The direct effect from the mediator namely perceived behavioral control to OCBs is 0.398 and this path coefficient is found to be significant ( $p = 0.039$ ,  $p < 0.05$ ). Nonetheless, the direct path coefficient from employee environmental values to OCBs is 0.167 and found to be not significant ( $p = 0.149$ ,  $p > 0.05$ ). The indirect effect from employee environmental values to OCBs through perceived behavioral control is 0.203 ( $0.510 * 0.398$ ). This is found statistically significant ( $p = 0.021$ ,  $p < 0.05$ ) through bootstrapping (Table 3). Hence hypothesis 2 is fully asserted. As the direct path is statistically insignificant whereas the indirect path (effect) is statistically significant, it can be concluded that full mediation occurs between employee environmental values and OCBs when perceived behavioral control acts a mediator. The results of mediation are provided in Table 4.

**Table 4 Test for the mediation effect of PBC between Employees' Environmental Values and OCBs**

	$\beta$	Boot S.E	Boot LLCL	Boot ULCL	p-value
A	0.510	0.160	0.283	0.825	0.006*
B	0.398	0.180	0.094	0.679	0.039*
a*b (Indirect)	0.203	0.111	0.075	0.468	0.021*
Direct (c')	0.167	0.145	0.025	0.423	0.149
Total	0.369	0.116	0.213	0.623	0.011*

\* Significant at 5 % level

## DISCUSSION

The main objective of this study is to investigate the effect of employees' environmental values and perceived behavioral control on OCBs among employees in Indian hotel sector. The findings of the study supported the hypotheses of the theoretical model. The findings reveal that employees' environmental values are positively related to perceived behavioral control. This is in line with the study by Chen and Tung (2014) which proved that if an individual has more environmental concern, he will be likely to have more perceived



behavioral control over visiting green hotels. Another significant finding of the study is the mediating effect of perceived behavioral control in the relationship between employees' environmental values and OCBs. This implies that if employees have enough resources and strong support from the hotel management (high PBC), it will stimulate the employees' environmental values to perform OCBs.

## **CONTRIBUTIONS OF THE STUDY**

The main contributions of this study are related to the empirical validation of certain propositions put forward by the emerging literature on OCBs. The first main finding establishes the positive relationship between Employees' environmental values and Perceived behavioral control (PBC). As PBC is composed of internal sources such as one's self-efficacy and external sources of control like obtaining the cooperation of others (Cordano & Frieze, 2000). If an employee doesn't receive the management support and the necessary resources to accomplish OCBs, but if he or she possesses high environmental values it would stimulate his or her internal source of control aspect of PBC to perform OCBs. The findings of the study confirmed the mediating role of perceived behavioral control in the relationship between employees' environmental values and OCBs. This significant finding fills the research lacuna that the mediating effect of PBC is analyzed only in the context of pro-social behaviors (Sanchez et.al; 2018) and travelers' pro-environmental behavioral intention to stay in green hotels (Chuang et.al, 2018).

## **DIRECTIONS FOR FUTURE RESEARCH AND LIMITATIONS OF THE STUDY**

The study has certain limitations which set avenues for future research. The dependent variables explored in this study are quite limited and do not cover all the possible outcomes of OCBs. Hence, future research should consider other psychological variables as well as organizational variables that may influence employee OCBs thus extending the scope of the research. The data are collected from only four premium eco-friendly Indian hotels constituting the sample size of 285 employees. Future study should be conducted among a larger sample size incorporating more eco-friendly Indian hotels which would extend the scope of the research.

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## **THE EFFECT OF TELEVISION ADVERTISEMENTS ON BRAND PREFERENCE OF CONSUMER DURABLES.**

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### **ABSTRACT**

Advertising is a major tool in creating product awareness and condition the mind of a potential consumer to take eventual purchase decision. Marketer's survival is based on consumer satisfaction. Consumer satisfaction depends on their perception and brand preference towards particular brand, and the role of advertisement begins here. This study is an attempt to find the effect of television advertisement on brand preference of consumer durables. Convenient sampling technique has been adopted for the study. Primary data have been collected from 50 sample units. It was found that age, and income were statistically significant in predicting the attitude towards advertising. This study reveals that quality and brand name were ranked as the important parameters for brand preference.

### **Key words**

**Advertisement, Consumer durables, Brand preference, Perception**

### **INTRODUCTION**

The importance part of business survival is sales and the connection between the customer and manufacturer, and this influence the consumers' decision to purchase its products. This is where advertising and brand management are relevant. Advertising is a subset of promotion mix which is one of the Four 'P's in the marketing mix i.e . product, price, place and

promotion. As a promotional strategy, advertising serves as an important role in creating product awareness and condition the mind of an ultimate consumer to take purchase decision. Marketer's survival depends on consumer satisfaction. Consumer satisfaction depends on the consumer perception and brand preference of the particular brand. Here, advertising plays a major role. Nowadays consumer durables have become essential part in lifestyle of the people in the society. There are number of brands available in the market. To increase the sales of these brands, different advertisements are available in different platforms. Advertisement should create a positive attitude in consumers' mind with regard to brand preference otherwise the money, time and efforts spent on advertisement will go in vain. This research studies about the "The Effect of Television Advertisement on Brand Preference on Consumer Durables". Advertisement allows people to make good choices and not fall to scams. Advertising effectively communicate between producers and consumers.

## **STATEMENT OF THE PROBLEM**

It has often been said that television is an advertising medium where the consumer spends the most of leisure time. However, the main thing is the marketer should identify the influence of advertising in consumer brand preference. All kinds of companies or institutions find television advertising as a suitable means of publicity and hence importance of television advertisement is increasing day by day. Nowadays consumer durable goods companies are advertising their products so much on televisions and are spending so much money on the celebrities to endorse their products. Television advertisements usually play a role in drawing attention from consumers to purchase a product. introducing a product. The impact of the television advertisements is greater than that of the print media or radio. Therefore, it is necessary to study different aspects of television advertisements and their impact on consumers' perception and purchase decision. Consequently, this study is an attempt to measure the effect of advertising on consumer behavior in respect of consumer durable goods. In fact, this study is an attempt to know the effectiveness of television advertisement on the purchasing attitude and brand preferences of consumers.

## **OBJECTIVES OF THE STUDY**

- To study the effect of Television advertisement on brand preferences of consumer durables.
- To know about the factors influencing the consumers to purchase consumer durables.

## RESEARCH METHODOLOGY

Convenience sampling technique has been adopted for the study. 50 sampling units were taken for the study. Primary data have been collected with the help of a well-structured questionnaire and informal personal discussions with the sample respondents. The secondary data have been collected from different sources such as published research papers, research articles in national and international journals, seminar reports, newspapers, books, departmental publications and working papers. Simple percentage analysis has been used for the data analysis.

## REVIEW OF LITERATURE

**Hemamalini KS, Ms Shree Kala Kurup (2014): Effectiveness of television advertisement on purchase.** In this study it is found that advertising has become the most effective ways for the companies to transmit the product information to the consumers. The words, graphics and images are used to display the products are very attractive so that the consumers purchase the product with out much confusion. The previous researches have proved that celebrity endorsement, and advertising affect the consumers purchase intentions. Data were gathered in Singapore via a self-administered survey and the results indicate differential effects of brand associations such as price perceptions, brand personality, brand- elicited feelings, self-image and brand-user-image congruency on consumer brand preferences and purchase intentions.

**Deepa Ingwale (2013) : An impact of advertisements on purchase decision of youth** Advertising is the key for building, creating and sustaining brands. Advertisements play a major role in buying behavior of the customers.

**Vyas, Hitesh D (2011) :** In their study it reveals that company or brand name, guarantee / warrantee, price and after sales service are the important factors in purchase of durables. Sources of information regarding authorized dealers and shops, and technical expert advice through, media and influence of friends, relatives and neighbors were found important factors influencing in purchase of consumer durables.

**Ayanwale, A. B., Alimi, T., & Ayanbimipe, M. A. (2005) : The influenceof advertising on consumer brand preferences.** When competition is keen and the consumers are faced with brand choice in the market, it becomes important for the manufacturers to understand the



major factors that can attract the attention of buyers to his own brand. These then form the basis for marketing panning and action.

### Data analysis and interpretation

**Table 1: Responses for various questions**

Age	Number of Respondents	Percentage
Below 21	4	8
22 - 24	12	24
Above 24	34	68
<b>Income of the respondent</b>		
Below Rs.20000	6	12
Rs. 20000-40000	32	64
Rs. 40000-60000	10	20
Above Rs.60000	2	4
<b>Television viewers</b>		
Yes	46	92
No	4	8
<b>Likes of watching Television advertisements</b>		
Yes	39	78
No	11	22
<b>Frequency of watching Television</b>		
Regularly	18	36
Weekly	16	32
Occasionally	16	32

(Source: Primary data)

It is found that 68% of the respondents are above the age of 24, 24% of the respondents are 22years to 24 years of age and 4% of respondents are below 21 years of age. 52% of the respondents are in urban area and 48% of respondents are in rural area. It shows that television advertisements reach every part of the country. 92% of the respondents are watching Television and 8% of respondents are not watching Television. It shows that most of the population watches Television. 36% of respondents watch regularly, 32% of respondents watch Television weekly and 32% of respondents watch Television occasionally. Which means that every respondent watches television and they are exposed different advertisements. This table shows that most of the (78%) respondents likes to watch television advertisements and 22% of respondents doesn't like to watch Television advertisements. It

shows they are attracted to Television advertisements.

**Table2: Responses for various questions**

<b>Category of Television advertisements</b>	<b>Number of Respondents</b>	<b>Percentage</b>
Food products ads	7	8.86
Consumer durables ads	33	41.77
Cosmetics ads	3	3.79
Automobiles ads	7	26.58
Costumes ads	21	12.65
Jewelry ads	5	6.32
<b>Assessment of quality of the consumer durable goods</b>		
Brand Reputation/image	26	52
Price level	20	40
Brand ambassador	4	8
<b>Response after watching Television advertisements</b>		
Ignore it	21	42
Remember when you make a purchase	10	20
Explore about the product	19	38
<b>Effect of advertisement on Brand choice</b>		
Yes	44	88
No	6	12
<b>Impact of advertisement on involvement in purchasing</b>		
Strongly agree	8	16
Agree	18	36
Neutral	12	24
Disagree	10	20
Strongly Disagree	2	4

<b>Impact of advertisement in brand preference</b>		
Strongly agree	22	44
Agree	12	24
Neutral	14	28
Disagree	1	2
Strongly Disagree	1	2
<b>Necessary for consumers to know about consumer durables</b>		
Strongly agree	22	44
Agree	12	24
Neutral	8	16
Disagree	6	12
Strongly Disagree	2	4

(Source: Primary data)

Consumer durables ads (42%) eats a big slice as most liked advertisement category. So the companies that produce consumer durable goods can focus more on Television advertisements in promoting their goods. 52% of respondents choose Brand reputation/Image as the main criteria in assessing the quality of consumer durable goods through the Television advertisements, followed by the Price level (40%). So it can be interpreted that Television advertisements will help assess the quality of consumer durable goods. 42% of the respondents ignore it after watching an advertisement. 38% of the respondents tend to explore about the product and 20% of respondents remember when they make a purchase. 36% of the respondents agree that exposure to Television advertisement will enhance the involvement purchasing. 24% respondents has neutral opinion about the impact of advertisement in enhancing involvement in purchasing.

**Table 3: Influencing factors to purchase consumer durable**

Factors	Very influential	Influential	Medium influential	Less influential	Least influential
Repetitive ads	26	14	8	0	2
Information	16	32	0	2	0
Price awareness	22	20	8	0	0
Brand ambassador	8	26	6	6	4
Durability	20	16	14	0	0

(Source: Primary data)

From the data given it shows that frequency of advertisements in television and informative ads influences the respondents to purchase the consumer durable goods. price awareness of the consumer durable goods plays a significant role in influencing the respondents.

## **FINDINGS**

- Most of the respondents are interested to watch advertisements in Television.
- The respondents are of the opinion that advertisements are important in terms of enjoying and gaining product information and make them aware about different brands of durables.
- Majority of the respondents agree that repetitive adds are very influential.
- Frequency of advertisements in Television and informative advertisements influence the respondents to purchase the consumer durable goods.
- A good proportion of the respondents strongly agree that Television advertisement helps to know about the consumer durable goods.

## **SUGGESTIONS**

- One of the most powerful factor for purchasing decision in the consumer durables market is quality motive. Therefore, the durable producer companies should focus on this motive and this should be highlighted in advertisements also.
- The advertisement should aim to create faith and goodwill in the minds of the consumers and it should contain the core principles of believability, uniqueness, reputation and reasonable claims
- Give true information about the brand in the Advertisement and maintain the good will of the brand in the market.
- Maintain the integration with Advertisement and brand is important.
- Advertisement should be believable and it has to make the brand believable.
- Advertisement should be based on product and its suitability with different categories of demographic profiles. Effectiveness of the advertisement should be taken care of.

## **CONCLUSION**

It was found that age, occupation, and income were statistically significant in predicting the attitude towards advertising, consumer behavior and brand preference for consumer durables. It is probably due to these factors that companies target different groups through advertisements and there has been an increase in their advertising spend. It is quality that determines repeat purchases and brand loyalty of consumer durables. The reasons for preference of the brands ranged from quality to availability. But it was quality and brand name that was ranked as the important parameter for brand preference. The central task of advertising is to place the brand in the desired position in the prospects mind. Powerful advertising leads to powerful brands. In the end one can conclude that advertising is playing a positive role in the promotion of consumer durable products and people who are exposed to it are influenced substantially.

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**THE INFLUENCE OF ONLINE PRODUCT INFORMATION ON  
CUSTOMER RESPONSES AMONG INDIAN ONLINE CUSTOMERS  
OF ELECTRONIC GOODS**

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**ABSTRACT**

The product information is very important in the purchase decision as researches have shown its influence on the consumers' affective states, which in turn leads to the customer loyalty. There are researches that have explained the relationship between the product information and the consumer responses. However, not much research has been done to study the influence of the online product information on the repurchase intentions and word-of-mouth intention through consumer emotions (positive and negative) as the affective states especially in electronic goods category. Customers are sometimes reluctant to purchase online due to the inability of the online stores to provide complete product information via online. The chance of switching to another online retailer is high, when the retailers fail to provide necessary product information online. The purpose of this study is to find out how online product information (with respect to electronic goods) affects the customer responses (repurchase intention and word-of-mouth intention) through consumers' emotional states such as positive and negative emotions. The online survey was conducted among the online customers of electronic goods in Kerala. There were 548 valid responses, out of which 52.4% of the participants were female, 62% of the respondents were below 30 years of age and 56.4%

were employed. The SEM (structural equation modeling) was used to test the relationships and found that the online product information has an influence on the consumer emotions, which then affect the customer responses too. The present study will be useful to the marketers of online stores to focus on the product information provided in their websites in order to create a positive response among its users.

**Keywords - Repurchase Intentions, Word-of-mouth Intentions, Online Product Information, Online Shopping, Positive Emotions and Negative Emotions.**

## **INTRODUCTION**

Customer responses such as repurchase intention and word-of-mouth intention are considered to be the measures of online store loyalty, which has more relevance today in the online shopping context. Customer loyalty can be determined from the customers repurchase intention and word-of-mouth intention. The “degree to which customers are faithful to a firm’s products or services and the strength of their propensity to choose one brand over the other competitor” can be termed as customer loyalty. The loyal customers are considered as an asset to any organisation. The loyal customers are capable of bringing new customers to the store as well as the existing customers may leave the store permanently due to the lack of customer loyalty, which in turn may affect the store’s sales to its existence itself. Therefore, it is important to study the customer responses for every organisation.

One of the biggest challenges faced by the online retailers are their limitations to contact their customers directly (face to face) as well as the customers do not have the chance to explore the product physically (Phau and Poon, 2000; Goldsmith and Goldsmith, 2002). Therefore, the marketing specialists of the online stores need to have an eye on the online store’s website to deal with these challenges. Online stores may consider a lot of online store stimuli such as atmospherics, customer reviews, product demonstration, navigational tools, product information etc. to overcome these challenges. Online product information is one of the important cues among the online store stimuli to have a favourable influence on the customer responses. As the product information is very important for products such as electronic goods as these products are purchased by the customers based on the product description. Online product information includes available product colours, size, price etc. The emotional states of the customers are also considered in this study to know the relationship between online product information, consumer emotions and customer responses.



The present study is an attempt to study the effect of online product information on customer responses through their emotional states. The researchers selected this area of study as online shopping is increasing day by day at an alarming rate as well as online stores are competing with each other to serve their customers better to build store loyalty. At the same time, the customers would like to visit different online stores and it is easy for them too. The reason behind searching other online stores may be because of the lack of online product information. Therefore, the present study focuses on the relationship between online product information and customer responses such as repurchase intention and word-of-mouth intention.

## **OBJECTIVES**

1. To know the effect of online product information on the consumer emotions (positive and negative emotions).
2. To understand the relationship between consumer emotions (positive and negative emotions) and customer responses (repurchase and word-of-mouth intentions).

## **LITERATURE REVIEW**

*Online Product Information:* The online stores use their websites to communicate to the customers. The product related information needs to be provided through these websites. As the customers have no other options to clarify their doubts about the products, it is very important for the online stores to provide sufficient product information on the website. The information given should not be overloaded also, as it may result in information overload and customers may take more time to search for the required information. The online product information means the sum of information given by the online retailers in their websites to help the customers. It includes the availability of different product colours (Ha, Kwon, & Lennon, 2007), product sizes, product price, latest product information and quality product images (Seock & Norton, 2007). According to Park & Stoel (2002) the online product information plays an important role in the goodwill of the online stores.

*Emotions:* Mehrabian and Russell's (1974) mentioned pleasure, arousal and dominance (PAD) as emotional states as a reaction towards the environmental cues. The PAD scale to measure the emotional state offers a bipolar framework. Even though the bipolar framework is common in use, various limitations have also been found when it is applied to the

consumption-related emotion studies. As per the studies of Westbrook (1987), it was found that the unipolar view is more suitable in consumer studies compared to the bipolar framework as it is not possible to measure the joint experience of pleasant and unpleasant states. Watson, Clark, & Tellegen (1988) used the 'PANAS' (Positive Affect Negative Affect Scale) scale to assess the emotional states. The present study adopted Izard's (1977) Differential Emotions Scale (DES), a unipolar framework for measuring emotions such as interest, joy, surprise, sadness, anger, disgust, contempt, fear, shame and guilt.

*Customer Responses:* The attitude and behavior relationship can be seen in the Fishbein and Ajzen's (1975) theory of reasoned action, as it explains that the individual's behavior can be decided by behavioral intentions (i.e. potential behavioral tendencies of a person). According to Heung and Gu (2012) behavioral intentions encompasses the repurchase intentions and word-of-mouth intentions. Repurchase intentions refers to the willingness to revisit and purchase again from the store and the intention to communicate positive words about the store and its products to other customers can be termed as word-of-mouth intention (Donovan and Rossiter, 1982).

## **THEORETICAL FRAMEWORK**

The SOR (stimulus– organism–response) framework of Mehrabian and Russell (1974) explains that the environmental cues can influence the emotional states of the customers and it can then change the customers' approach or avoidance behaviour. The SOR framework has been used in various situations and can also be applied to e-tailing too. According to Wolfinbarger & Gilly (2001), information is an indispensable resource in online retailing as the extensive availability of the information is one of the reasons that online shoppers view, search and purchase via the internet. The comprehensive product information available online controls the repurchase and word-of-mouth intention (behavioural intentions) of the customers (Cho & Sagynov, 2015). Here in this study, the researchers applied the SOR framework and considered online product information as the stimulus (S), positive and negative emotions as the organism (O) and repurchase and word-of-mouth intentions as the responses (R). The six hypotheses were developed for the study based on the SOR framework is as follows,

**H1:** *Online Product Information* is positively related to *Positive Emotions*.

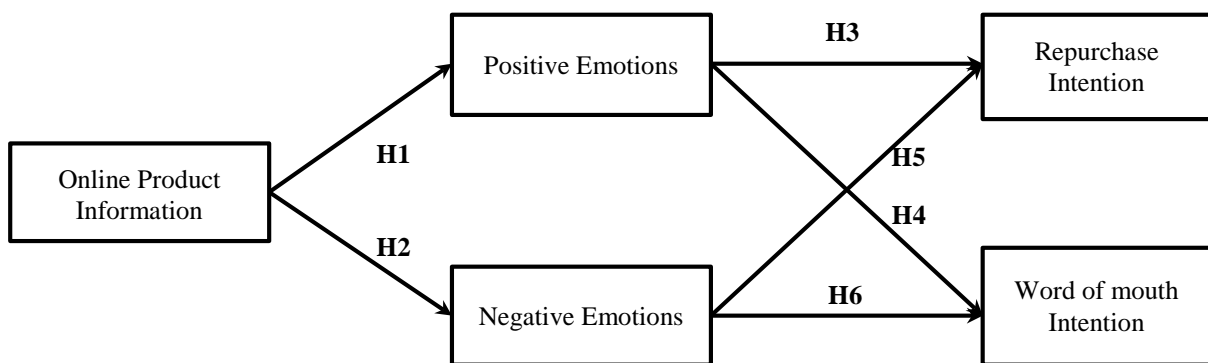
**H2:** *Online Product Information* is negatively related to *Negative Emotions*.

**H3:** *Positive Emotions* are positively related to *Repurchase Intention*.

**H4:** *Positive Emotions* is positively related to *Word of mouth Intention*.

**H5:** *Negative Emotions* are negatively related to *Repurchase Intention*.

**H6:** *Negative Emotions* are negatively related to *Word of mouth Intention*.



*Fig. 1: Customer Responses to Online Product Information Model*

(Source: Developed for the study)

## **METHODOLOGY**

### **Participants and Procedure**

Five forty-eight valid responses from the customers who have purchased electronic goods online and responded to the online questionnaire (google form) sent via email and social media were taken into consideration for the analysis of data. Out of this, 52.4% of the participants were female, 62% of the respondents were below 30 years of age, 26.1% were aged between 30 and 40 years and 11.9% were above the age of 40 years. 46.3% of the respondents were married, 80.3% respondents were postgraduates or above, 56.4% were employed.

## MEASUREMENT INSTRUMENTS

*Online Product Information:* The customer's perception towards the online product information was measured using a scale consisting of 5 items adapted from Seock & Norton (2007). Those five items are "This online store shows all the colours available for each product", "This online store shows all the sizes available for each product", "This online store tells the prices of products", "This online store gives up-to-date information about products" and "This online store gives good quality photos of products". Participants responded to these statements on a five-point Likert scale (1-strongly disagree to 5-strongly agree) provided by the researcher, with respect to their purchase of electronic goods from an online store. All items of the online product information have loadings greater than 0.70 and cross-factor loadings less than 0.30. The Cronbach's alpha of the variable is also greater than 0.80.

*Customer Emotions:* In this study the researcher adapted the unipolar scale of consumer emotions (Izard, 1977; Jang and Namkung, 2009) as previous researches have shown the superiority of the unipolar view in measuring the consumer emotions. The present study used a four-item scale for measuring the positive emotions (PE) and a five-item scale for negative emotions (NE). The items to measure the positive emotions were "Joy", "Excitement", "Peacefulness" and "Refreshment". The five items to measure the negative emotions included "Anger", "Distress", "Disgust", "Fear" and "Shame". The respondents indicated their level of emotions on a 7-point scale provided by the researchers with (1) as I never felt this emotion to (7) as I strongly felt this emotion. All of the positive and negative emotion items loaded higher than 0.75 and cross-factor loadings less than 0.20. The variable's Cronbach's alpha is greater than 0.80.

*Customer Responses:* In this study the researchers considered repurchase intention and word-of-mouth intention as the customer responses. Here we used a 3-item scale for measuring the repurchase intention adapted from Parasuraman et al., 2005 and Fang et al., 2011. The items were "If I could, I would like to continue using this online store to purchase electronic products", "It is likely that I will continue to purchase electronic products from this online store in the future" and "I intend to continue purchasing electronic products from this online store in the future". The researchers used a 5-point Likert scale (1 as strongly disagree to 5 as strongly agree) to measure the repurchase intention. All of the repurchase intention items factor loadings ( $>0.80$ ), cross-factor loadings ( $<0.20$ ) and Cronbach's alpha ( $>0.80$ ) are satisfactory.

The word-of-mouth intention was measured using a 3-item scale modified from the works of Parasuraman et al., 2005 and Zeithaml et al., 1996. The three items included were “I intend to tell my friends and relatives about my experiences with this online store”. “I intend to say positive things about this online store to other people”, “I intend to recommend this store if someone asks me for information”. Participants indicated their responses on a 5-point Likert scale (1 as strongly disagree to 5 as strongly agree). All of the word-of-mouth intention items factor loadings ( $>0.80$ ), cross-factor loadings ( $<0.20$ ) and cronbach's alpha ( $>0.80$ ) satisfied the model fit requirements.

## DATA ANALYSIS AND RESULTS

The SEM (structural equation modelling) analysis report obtained from the WarpPLS software is given in Figure 2. Table 1 provides the results of the model fit. The reliability and validity of the model was also found to be satisfying (Table 1).

<b>TABLE 1: QUALITY CRITERIA AND OBSERVED VALUES</b>		
<b>Quality Indices</b>	<b>Criteria</b>	<b>Observed Value</b>
Model fit	Average path coefficient (APC)	APC=0.351, P<0.001
	Average R-squared (ARS)	ARS=0.216, P<0.001
	Average adjusted R-squared (AARS)	AARS=0.214, P<0.001
	Average block VIF (AVIF): acceptable if $\leq 5$ , ideally $\leq 3.3$	AVIF=1.000
	Average full collinearity VIF (AFVIF): acceptable if $\leq 5$ , ideally $\leq 3.3$	AFVIF=2.694
	Tenenhaus GoF (GoF): small $\geq 0.1$ , medium $\geq 0.25$ , large $\geq 0.36$	GoF=0.423
	Sympson's paradox ratio (SPR): acceptable if $\geq 0.7$ , ideally = 1	SPR=1.000
	R-squared contribution ratio (RSCR): acceptable if $\geq 0.9$ , ideally = 1	RSCR=1.000
	Statistical suppression ratio (SSR): acceptable if $\geq 0.7$	SSR=1.000

	Nonlinear bivariate causality direction ratio (NLBCDR): acceptable if $\geq 0.7$	NLBCDR=1.000
Cronbach's alpha coefficients	$>0.7$	Satisfied
Composite reliability	$>0.7$	Satisfied
Average variance extracted	$>0.5$	Satisfied
Convergent validity	P values associated with the loadings be lower than 0.05; and the loadings to be equal to or greater than 0.5; cross loadings to be less than 0.5	Satisfied
Discriminant validity	The square root of the average variance extracted should be higher than any of the correlation involving that latent variable	Satisfied
Effect sizes for path coefficients	Effect sizes of 0.02, 0.15, and 0.35 are for small, medium and large effect	Satisfied

### *Testing Hypotheses*

The SEM of customer responses (repurchase and word-of-mouth intentions) to online product information through customer emotions is shown in figure 2. In order to develop the structural equation model, five latent variables (online product information, positive and negative emotions, repurchase and word-of-mouth intentions) were defined and these variables were connected through direct links between them based on the proposed model. Table 2 gives the results of the hypotheses (H1 to H6) tested using partial least square regression analysis.

<b>TABLE 2: RESULT OF HYPOTHESIS TESTING</b>				
<b>Hypothesis</b>	<b>Statement</b>	<b>Beta Value</b>	<b>P Value</b>	<b>Interpretation</b>
H1	<i>Online Product Information</i> has a significant positive effect on the <i>Positive Emotions</i> of the customers towards online stores.	0.46	<0.01	Supported Hypothesis
H2	<i>Online Product Information</i> has a significant negative effect on the <i>Negative Emotions</i> of the customers towards online stores.	-0.16	<0.01	Supported Hypothesis
H3	<i>Positive Emotions</i> have a significant positive effect on the <i>Repurchase Intention</i> of the customers.	0.52	<0.01	Supported Hypothesis
H4	<i>Positive Emotions</i> have a significant positive effect on the <i>Word-of-mouth Intention</i> of the customers.	0.49	<0.01	Supported Hypothesis
H5	<i>Negative Emotions</i> have a significant negative effect on the <i>Repurchase Intention</i> of the customers.	-0.23	<0.01	Supported Hypothesis
H6	<i>Negative Emotions</i> have a significant negative effect on the <i>Word-of-mouth Intention</i> of the customers.	-0.23	<0.01	Supported Hypothesis

The hypotheses 1 and 2 (H1 and H2) anticipated a significant positive and negative effect of the online product information on the positive emotions and negative emotions respectively. The result explains that online product information caused a significant amount of variance on the positive emotions ( $R^2=0.21$ ), but caused only a very few amount of variance on the negative emotions ( $R^2=0.03$ ). It indicates that even though there is an effect of online product information on negative emotion, there can be some other factors which have significant effect on negative emotions. The online product information has a positive effect on positive emotions (0.46,  $p<.01$ ) and has a negative effect on negative emotions (-0.16,  $p<.01$ ). Therefore, the results supported the hypotheses H1 and H2.

Hypotheses 3, 4, 5 and 6 (H3, H4 and H5) predicted a positive relationship between positive

emotions and customer responses (repurchase and word-of-mouth intentions); negative relationship between negative emotions and customer responses (repurchase and word-of-mouth intentions). The result shows that positive and negative emotions caused a significant amount of variance on customer responses (repurchase intentions,  $R^2=0.33$  and word-of-mouth intentions,  $R^2=0.30$ ). The positive emotions have a positive effect on customer responses (repurchase intentions, 0.52,  $p<.01$  and word-of-mouth intentions, 0.49,  $p<.01$ ). The negative emotions have a negative effect on customer responses (repurchase intentions, -0.23,  $p<.01$  and word-of-mouth intentions, -0.23,  $p<.01$ ). Therefore, the results supported the hypotheses H3, H4, H5 and H6.

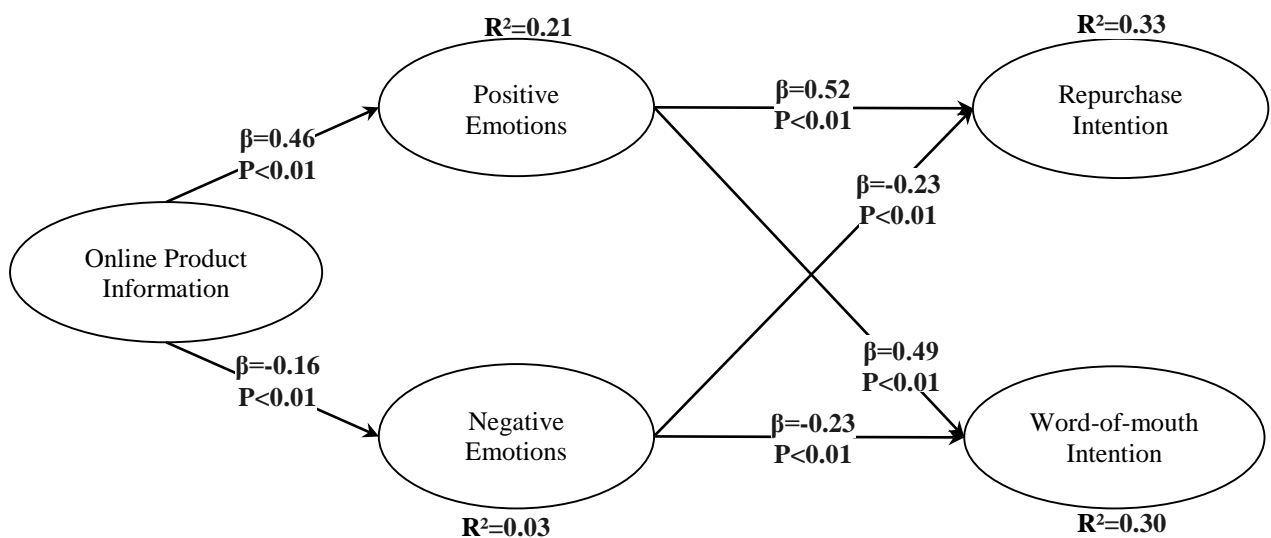


Fig. 2: Effect of online product information on customer responses through emotions

## DISCUSSION

The SOR (Stimulus-Organism-Response) framework plays a significant role in the area of consumer behaviour as it explains how marketers can create favourable customer responses (behavioural intentions or approach behaviour) towards their products or service by changing the stimuli (marketing or environmental). The present study was conducted among the online electronic goods customers to understand the effect of online product information on the repurchase and word-of-mouth intention via customer emotions.

Consistent with the theoretical framework proposed in the present study, the online product information predicted the consumer emotions (positive and negative) and the consumer emotions also strongly predicted both repurchase and word-of-mouth intention. Therefore, it is evident that the online product information will have an effect on the repurchase and word-



of-mouth intentions of the consumers with respect to the purchase of electronic goods via online. This points out that the online product information such as size, colour, price, photos and up-to-date information of the products offered will have a significant impact on the consumer's emotional states and that will further influence the repurchase and word-of-mouth intentions. The results of the study point out that the probability of consumers repurchasing again from the e-tailer and saying positive word-of-mouth communication about the store is dependent on the customer emotions (i.e. highest level of positive emotion and the lowest level of negative emotion) and these emotions can be controlled by the product information provided online. Hence, those who like the online product information may exhibit positive behavioural intentions.

The marketers or strategists may use the results of this study in order to reduce the chance of visiting other websites due to the non-availability of product related information via online by giving sufficient product information through their websites. The study shows that the online product information acts as a significant tool for the online stores for customer retention. The present study gave new insights to the various online product information elements. This study shows that proper utilisation of online product information can create positive emotions, which in turn helps to develop more loyal customers to the store. But if the online product information is not managed properly it will create negative emotions, thereby decreasing the customer loyalty. Even though the present study was focused on online product information, the variables like online store atmospherics, navigational tools, online advertisement, customer reviews etc. gives scope for future research in this area. The mediating effect of perceived risk, trust etc. can also be taken into consideration for the future studies.

## **CONCLUSION**

The following recommendations can be obtained from the results of the study:

- Online product information is capable of creating emotions (either positive or negative) towards the online store among its customers. Therefore, the online stores should provide necessary information about the products offered online in order to create positive emotions as well as it may lead to negative emotions if sufficient information is not provided.

- The repurchase and word-of-mouth intention is positively affected by the positive emotions and negatively by the negative emotions. Hence the online retailers should try to create positive emotions in the customers and need to avoid situations which may lead to negative emotions.

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## **A COMPREHENSIVE STUDY ON EARLY DETECTION OF SKIN CANCER**

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### **ABSTRACT**

Skin cancer is a type of cancer that grows in the skin tissue, which can cause damage to the surrounding tissues, Skin cancer is the most common form of cancer. It occurs when there is an irregular growth of skin cells. The cells are also how physicians identify the type of skin cancer. The increase in ultraviolet radiation on the Earth's surface is also helping skin cancer spread in every corner of the world. Benign and malignant types are the most common skin cancers.

**Keywords:** Artificial Neural Network (ANN), Convolutional Neural Network (CNN), Kohonen Self-Organizing Neural Network (KNN), Generative Adversarial Network (GAN)

### **INTRODUCTION**

The skin is the body's largest organ. In addition to helping to control body temperature, it safeguards the body from damage and infection. Along with producing vitamin D, the skin also stores fat and water. Three primary layers make up the skin. The outer layer of skin is epidermis, the inner layer of skin is dermis and the deep layer of fat is hypodermis. Cancer starts when healthy cells transform and proliferate uncontrollably to form a mass known as a

tumor. A tumor may be benign or malignant. A malignant tumor is one that has the potential to develop and spread to different bodily sites. A cancerous tumor is malignant, meaning it can grow and spread to other parts of the body, so it is curable in initial stages, which is why it is best detected at early stages.

There are different types of skin cancers.

- **Basal cell carcinoma**

Basal cells are the rounded cells present in the bottom epidermis. This kind of cell is the origin of 80% of skin malignancies. Although it can occur anywhere on the skin, basal cell carcinoma most frequently appears on the head and neck. The main causes of it are sun exposure and radiation therapy that was given to youngsters.

- **Squamous cell carcinoma**

Squamous cells, which are flat, scale-like cells, make up the majority of the epidermis. These cells give rise to squamous cell carcinomas, which make up 20% of all skin malignancies. Squamous cell carcinoma can be found in numerous areas of the skin because it is mostly brought on by sun exposure. Additionally, it can develop on skin that has been burned, damaged by chemicals, or exposed to x-rays. Common sites for squamous cell carcinoma include the lips, skin around the mouth, the anus, and a woman's vagina. Squamous cell carcinomas spread to other areas of the body in between 2% and 5% of cases.

- **Merkel cell cancer**

Merkel cell cancer is a rare malignancy which highly aggressive or rapidly spreading. It begins in the hair follicles and in the hormone-producing cells under the epidermis. Usually, the head and neck area are affected. Merkel cell cancer is also known as neuroendocrine carcinoma of the skin.

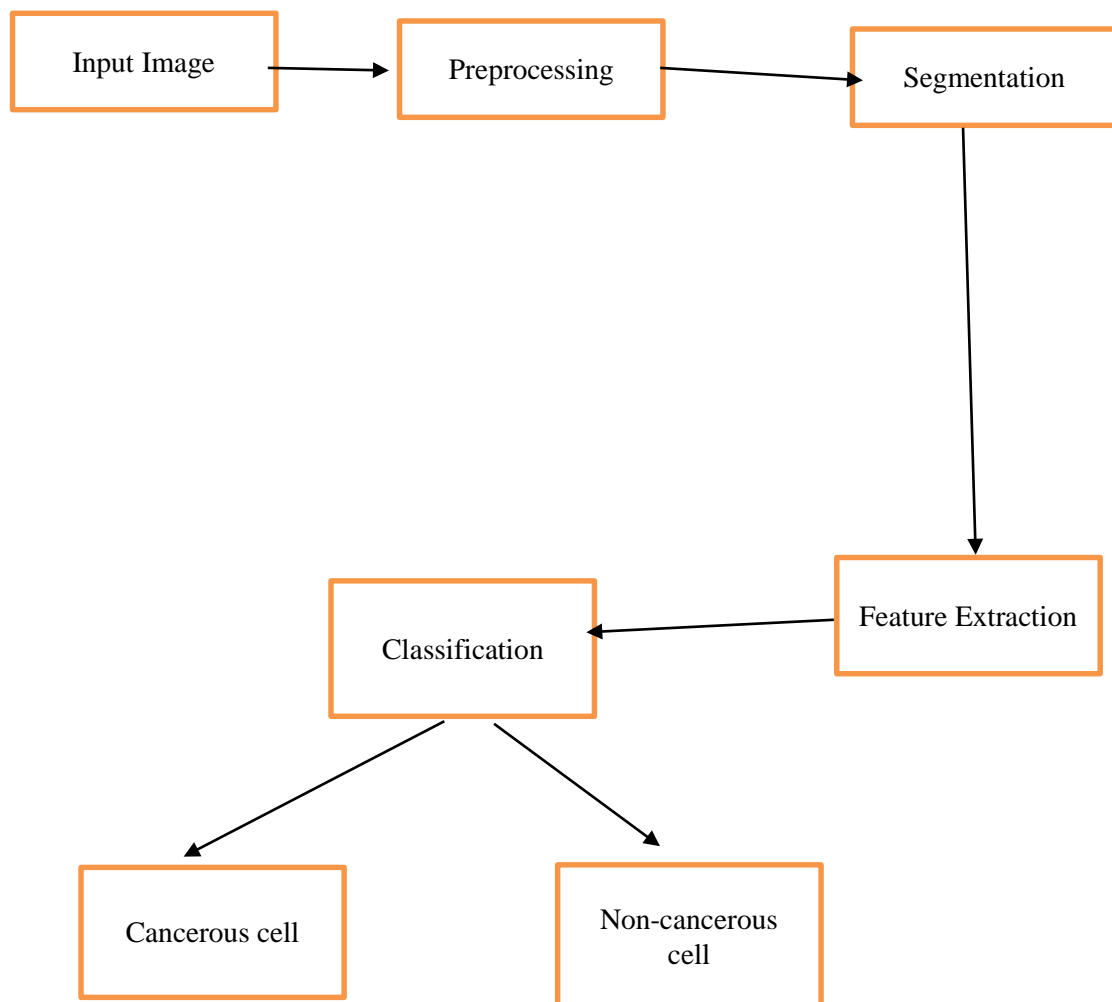
- **Melanoma**

At the junction of the epidermis and dermis, melanocytes can be found sporadically. Melanin, a pigment responsible for skin color, is produced by these cells. The most dangerous kind of skin cancer, melanoma, develops in melanocytes. Of all skin cancers, it causes roughly 1%.

Keratinocyte carcinoma is the collective term for basal cell carcinoma and squamous cell cancer.

This is because they start in keratinocytes, a particular kind of skin cell. Non-melanoma skin cancers include cutaneous lymphomas, Kaposi sarcoma, skin adnexal tumors, and sarcomas, which are all rare forms of the disease. Among these, Melanoma is the serious type of cancer. So, Researchers have developed various early detection techniques and distinguish benign skin cancer from melanoma.

The basic steps were to acquire the image, preprocess the input data set, segment the obtained preprocessed image, and extract the desired feature. Based on the feature extraction, the data set was then classified as benign or malignant.



The pre-processing method means the image can be divided into the image enhancement, restoration of images and removal of hair in the detection of skin cancer. Each phase comprises various methods. The Gaussian filter, mean filter, median filters, speckle noise

filters are as the most popular pre-processing techniques. The segmentation process are edge based, region based, Morphological based, active contours, histogram based thresholds etc. The features extracted are asymmetry of cells, diameters, compactness, borders, colors etc. are selected.

### **1. Artificial Neural Network (ANN)**

A nonlinear, statistical prediction approach is an artificial neural network. Its design was inspired by the biological framework of the human brain. Three layers of neurons make up an ANN. The first layer is referred to as the input layer; these input neurons transmit information to the neurons in the intermediate layer. The hidden layers are the intermediary layers. There may be multiple hidden levels in a conventional ANN. The third layer is output neurons that receives signals from intermediate neurons. While computations are performed at each layer, back propagation is used to understand the many connections and interactions between the input and output layers.

In skin cancer detection systems, The classification of extracted features is done using ANN. The classification of input photos as melanoma or non-melanoma happens after a training set has been successfully trained and categorized. The quantity of input images affects how many hidden layers an ANN has. The hidden layer and the input/first layer of the ANN algorithm are connected by the input dataset. A supervised learning approach or an unsupervised learning method can be used to process a dataset, depending on whether it is labelled or unlabeled. To learn the weights present at each network connection or link, a neural network employs a back propagation or feed-forward architecture. The Underlying dataset is used by both architectures in a different way. Based on a feed-forward architecture, neural networks only transmit data in one way. The data moves only in input layer to the output layer.

### **2. Convolutional Neural Network (CNN)**

Convolution neural networks are a crucial variety of deep neural networks that are successfully applied in computer vision. It is used for image classification, putting together a collection of input images, and carrying out image recognition. By accumulating simple features like curves and edges to create more complex features like forms and corners, CNN is an excellent tool for gathering and learning both local and global data. Convolutional, fully linked, and nonlinear pooling layers make up CNN's hidden layers. A CNN may have several convolutional layers, followed by a number of fully linked layers. Convolution, pooling, and

full-connected layers are the three main categories of layers used in CNN.

### **3. Kohonen Self-Organizing Neural Network (KNN)**

KNN only need a few details regarding the input data's properties. A KNN typically consists of two layers: an input layer, which is a 2-D plane, and a competitive layer.

Without understanding the associations between the input data members, a KNN can be utilized for data clustering. A KNN functions as a dimension-reducer. It has the ability to transform high-dimensional data into low-dimensional data, such a two-dimensional plane. It offers discrete sorts of representation for the supplied dataset as a result. In terms of learning method, KNNs are distinct from other NN types in that they employ competitive learning as opposed to the error-correcting-based learning found in BPN or feed-forward learning.

A KNN preserves the topological structure of the input data space when dimensionality is mapped from high to low. The term "preservation" refers to the keeping of the spatial relative distance between data points. In this technique, the closer data points in the input data space are mapped closer to each other, and the farther data points are mapped farther away from each other as well, according to the relative distance between them. A KNN is the greatest tool for high dimensional data as a result. A KNN's capacity for generalization is a further crucial trait it offers. The network has the capacity to identify and arrange unidentified input data. The capacity of a KKN to map complicated associations of data points, even nonlinear ones, is one of its key strengths. KNNs are now utilized in skin cancer detection systems as a result of these advantages.

### **4. Generative Adversarial Network (GAN)**

An effective class of DNN is a generative adversarial neural network. Two neural networks, such as a generator and a discriminator, compete with one another to assess and capture the variation in a database. This is how GANs function. In an effort to lead the discriminator module astray, the generator module fabricates data samples using the data distribution. The discriminator module, on the other hand, seeks to discriminate between authentic and fraudulent data samples. Both of these neural networks repeat these actions during the training period, and each competition results in an improvement in performance. The main strength of a GAN network is its capacity to produce false samples that are comparable to actual samples utilizing the same data distribution, such as photorealistic photos. There are



several different forms of GANs, including the Laplacian Pyramid GAN, Deep Convolutional GAN, and Condition GAN (CGAN) (LPGAN).

Reference Paper	Applied Methods or Techniques	Data set used	Accuracy of Measurements %	Remarks
[1]	Convolutional Neural Network (DCNN)	HAM 100000	Training 93.16% Testing 91.93%	DCNN model achieves a better classification rate when compared to other transfer learning models.
[2]	CNN	A/N	80.2%	Detecting and distinguishing between skin cancer from rashes images by employing CNN.
[3]	CNN	PH2	95%	Diagnosing three skin lesion classes, including malignant skin cancer lesion, melanoma
[4]	CNN	ISIC	97.78%	Autonomous dermoscopic detection pattern that employs deep convolutional neural networks.
[5]	GAN	ISIC 2018	86%	Enhancing DCNN performance on skin lesion classification via employing GAN to augment existing training set.
[6]	CNN with VGG-16,RESNET-50	Kaggle	86.6.	CNN classifier is used in which RESNET-50 and VGG-16 were used in which image were resized and weights were added and then the augmentation of the data can be done.
[7]	DCNN	www.dermnet.com	95.98%	Better comparable performance to the existing State-of-the-art methods in terms of accuracy, precision, recall, sensitivity, and specificity.

				It is also simple and lightweight architecture than other models.
[8]	ANN	31 dermoscopic images	96.9%	ABCD parameters for feature extraction
[9]	ANN	180 skin lesion images	93.33%	Histogram equalization for contrast enhancement
[10]	KNN	ISIC	classifiers for ABCD rule-65.39% classifiers for shape feature-62.19	The proposed methodology concentrates on comparing the SVM, Random forest and KNN and SVM provided better results than other classifiers.
[11]	KNN	ISIC	86.67%	Classification of mole images is done through k-Nearest Neighbors (k-NN) algorithm.
[12]	GAN	ISIC 2018	86.1%	In the suggested system, deconvolutional network and CNN as a module for discrimination and generation

## CONCLUSION

This paper, focus on different neural network strategies for skin cancer diagnosis. Skin cancer detection requires multiple stages, such as collection of data set, preprocessing, image segmentation, feature extraction and classification. Mainly the study concentrated on ANNs, CNNs, KNNs, and on ANNs, CNNs, KNNs, and GANs for classification of input images. As a comparative result, CNNs model achieves a better classification rate. In future Skin cancer can also be diagnosed with the CAD, which is user-friendly and robust for any conditions of acquired images.

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**“A STUDY ON SOCIAL MEDIA MARKETING BY WOMEN  
ENTREPRENEURS IN ERNAKULAM DISTRICT”**

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**ABSTRACT:**

Women who have been discouraged from working outside the home or building independent businesses are beginning to find a very success story by building micro-businesses that rely on online tool like social media. Here the study makes an attempt to find the factors influencing women entrepreneurs to use social media for marketing to make success, examine the usefulness of social media marketing among women entrepreneurs and find out the problems faced by women entrepreneurs while using social media platform for marketing. The study revealed that there is a significance difference between Age of the respondent with problems faced by Women entrepreneurs towards the use of social media marketing for business.

**(Key Words: Women entrepreneurs, social media marketing, problems faced by women entrepreneurs)**

## **INTRODUCTION**

Social media marketing is the use of social media platform to promotes a product or service. Social media marketing increase sales and publishing great content and analyzing results and running social media advertisements. Those women entrepreneurs who have the potential to do things differently social media marketing there played an important role in economically empowering women entrepreneurs. This study aims to contribute through a literature review on women in business and social media in order to understand whether and to what extent the studies conducted so far have addressed these issues: how and why are women entrepreneurs and managers using social media? Whether they use social media for marketing relations, networking or personal connections.

## **SIGNIFICANCE OF THE STUDY**

Social media platforms have opened up opportunities for women who are willing to work independently. Marketing campaigns can be easily handled with the use of powerful social media platform. There is a growing need to conduct more studies on study of social media marketing by women entrepreneurs.

## **STATEMENT OF THE PROBLEM**

Social media marketing has been identified as the opportunity platform for women entrepreneurs to market the product and service and to interact a connect with customers. So this study its aims to identify factors affecting adoption of social media marketing by the women entrepreneurs. The Study is Conducted in Ernakulam District with an end to Investigate Adoption of Social media marketing by Women entrepreneurs.

## **RESEARCH QUESTIONS**

- What are the potential benefits of social media usage in business by women entrepreneurs?
- What are the common problems of women entrepreneurs while using social media?

## **OBJECTIVES OF THE STUDY**

- To find out the factor influencing women entrepreneurs to use social media for marketing.
- To examine the usefulness of social media marketing among women entrepreneurs.
- To find out the problems faced by women entrepreneurs while using social media platform for marketing.

## **RESEARCH METHODOLOGY**

Research Design: The Research design used in the study is both descriptive and analytical in nature.

Sample Size: The sample size of 100 Women Entrepreneurs from Ernakulam District was selected for the study.

Sampling Method: Judgement sampling method is used for collecting the details of women Entrepreneurs using social media marketing in social media.

Source of the Data: Both primary and secondary data have been used for the purpose of the study. primary data has been collected from women entrepreneurs through structured questionnaire. secondary sources of information like journals, website etc. are also used for the study.

Tools: The analysis collected data has been made with the help of statistical tools like simple percentage analysis, Likert scale and ANOVA in SPSS. Analyzed data was presented using tables and graphs.

## **HYPOTHESIS**

H<sub>0</sub>: There is no Significance difference between demographic variable Age with Factors that influence by Women entrepreneurs towards the use of social media marketing for business.

H<sub>0</sub>: There is no Significance difference between demographic variable Education level with Problem s faced by Women entrepreneurs towards the use of social media marketing for

business.

## **SCOPE OF THE STUDY**

The study is related to the social media marketing by women entrepreneurs' social media allows female entrepreneurs to connect with other women entrepreneurs and with their probable customers.

## **LIMITATIONS OF THE STUDY**

- Most of the respondents were lazy to provide through information. Questionnaire was sent through online.
- That's a relief station is not possible because studies conducted in Ernakulam District.

## **REVIEW OF LITREATURE**

Masuda and Chowdhury, (2018) done an examination in Bangladesh, governmental and non-governmental development for women entrepreneurship ought to be actuated so as to expand the commitment of women towards the national economy. She likewise properly distinguished the serious problem of women entrepreneurship which incorporated the absence of credit of ices, skill training, market openings, troubles in procurement of crude materials and transportation. She additionally called attention to that some middlemen made problems by offering low costs. Entrepreneurship is a generally new field of research, not more than 20- 25 years old.

Malik and Rao, (2018) an exact examination was directed among 135 women entrepreneurs in Chandigarh to break down the purposes behind beginning business, discernment with respect to their success in business and quality credited to their success. The investigation uncovered that women were prepared to confront the challenges related with setting up of business.

Santha, (2017) uncovers in their examination that in Kerala, most of the women entrepreneurs (32%) had a high regard in the family, even before they progressed toward becoming entrepreneurs however in Tamil Nadu more prominent rate (56%) had no regard. Their position had changed in the wake of getting to been entrepreneurs.



## **THEORITICAL FRAMEWORK**

### Women entrepreneurship

Entrepreneurship is an innovative and dynamic-process, whereby new enterprise is created. Entrepreneurship among women is recent phenomenon. When an enterprise is established and controlled by a woman it not only boost economic growth but also has many desirable outcomes.

### Adoption of Social Media Marketing by Women Entrepreneurs

Social media is a top that is becoming quite popular these days because of its user friendly nature. It has opened a whole world new door to the business world and given them a big opportunity to interact and attract a large amount of customer. It is given a new and faster way of communication by exchanging pictures, stories, news, blogs, online discussions etc. Marketing the business in magazines, newspapers, and ads are great ways to get brand awareness out to the local public. Promoting and sharing also have a big impact on expanding the business brand. it better way to expand a business then by being able to share and promote through online services.

### Women entrepreneurs who used social media marketing to grow their business

The Kardashians: The Kardashians-Jenner family, particularly Kim Kardashian and kylie Jenner, intertwine product placement on the TV show with newer media for the successful marketing of products. The strategies they use are; wearing branded fashion, presenting beauty routines. The sisters Kourtney, Kim, khloe, kendall and kylie have accumulated a combined following of more than 700 million people.

Lilly Singh: Lilly Singh became the richest female You tuber in the world in 2017. In 2019 she made a fortune of

\$7.5 million from YouTube. Her social media platforms have made her famous across the globe. Lilly Singh has got more than 14 million subscribers and over 1.5 Billion views. sketches on all her social media posts. She made brilliant use of social media marketing, she gained a deserved loyalty from massive audience.

Sharadha Sharma : Sharadha sharma is the founder of Your Story a leading portal that covers

entrepreneurship and Indian Start up. With degree from St. Stephen's College and MICA, Sharadha had initially worked with Times of India and CNBC TV 18. Among her most impressive achievements, she was listed among the top 500 LinkedIn Influencers worldwide, she has also received the L'Oreal Paris femi award for online influence. Through storytelling, she created her own company and made herself well known as a startup successstory.

Richa Kar : With a mission to help women explore their radiant personalities, Richa Kar started Zivame in 2011. Since then she had been on an unstoppable journey taking Zivame to incredible heights. Zivame currently delivers to over 2000 pin codes across the world and with investors like Ratan Tata & Ronnie Screwvala supporting the company, it plans to grow further.

## DATA ANALYSIS AND INTERPRETATION

Analysis is done to organize and summarize to enhance the effects of result in a manner that enables to relate with the critical points of the study, the data is collected from 100 respondents through questionnaire.

### PART I-Percentage Analysis

Table 4.1-Age of Respondents

Classification	No. of Respondents	Percentage
Below 25	76	76
26-30	16	16
31-35	2	2
36-40	4	4
Above 40	2	2
Total	100	100

(Source: Primary data)

The above table shows that, 76 percent of the entrepreneurs are belong to age group below 25, 16 percent belong to 26- 30 age group, 2 percent belong to 31-35 age group, 4 percent belong to 36-40 age group and 2percentages is above 40.

Table 4.2 First type of Store of respondents

<b>Classification</b>	<b>Frequency</b>	<b>Percentage</b>
Physical Store	23	23
Online Store	77	77
<b>Total</b>	<b>100</b>	<b>100</b>

From the above table, it is clear that, 13 out of 50 respondents have store. Out of 13 respondents, 23 percent of respondents started physical store for the first and 77 percent of respondents started online store for the first time.

Table 4.3-Education level of the Respondents

<b>Classification</b>	<b>Frequency</b>	<b>Percentage</b>
SSLC	4	4
Higher Secondary	2	2
Degree	52	52
Post-Graduation	40	40
<b>Total</b>	<b>100</b>	<b>100</b>

From the above table, 4% entrepreneur have SSLC education, 2% are higher secondary 52 % are graduated. 40% are post graduated 2% for entrepreneurs belongs to others.

Table 4.4-Material Status

<b>Classification</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Married	22	22
Unmarried	78	78
<b>Total</b>	<b>100</b>	<b>100</b>

From the above table, it is clear that, 22 percent of entrepreneurs are married and 78 percent of entrepreneurs are unmarried.

Table 4.5-Kind of business

<b>Classification</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Food	16	16
Art and Craft	34	34
Fashion	26	26%
Mehndi design	6	6
Makeup Artist	14	14
Rentals	4	4
<b>Total</b>	<b>100</b>	<b>100</b>

From the above table, it is clear that, 16 percent of entrepreneurs are doing business based on Art and craft, 34% are doing Art and Craft business, 26 percent are doing business based on fashion, 6 percent are Mehndi designers, 14% are Makeup artists and 4 percent of entrepreneurs are doing Rental business.

Table 4.6-Number of Employees of Respondents

<b>Classification</b>	<b>No. of Respondents</b>	<b>Percentage</b>
No Employee	58	58
One to three	26	26
More than 3	16	16
<b>Total</b>	<b>100</b>	<b>100</b>

From the above table and figure it is clear that, 58 percent of respondents have no employees. 26 percent of respondents have 1 to 3 employees and 16 percent of respondents have more than 3 employees.

Table 4.7-Source of Initial Capital

<b>Classification</b>	<b>No.of Respondent</b>	<b>Percentage</b>
Personal saving	64	64
Spouse or Family	28	28
Financial Institution	8	8
<b>Total</b>	<b>100</b>	<b>100</b>

As per the above table, 64 percent of respondents have started the business with their personal savings. 28 percent of respondents' initial capital is from spouse or family and 8 percent of respondents' initial capital is from financial institution.

Table 4.8-Annual Income of the Respondents

Classification	No. of Respondent s	Percentage
Less than 10,000	20	20
10,000-50,000	64	64
50,000-1,00,000	16	16
More than 1,00,000	4	4
Total	100	100

As per the above table, 64 percent of respondents have an annual income between 10000 to 50000, 20 percent of respondents are earning less than 10000 annually, 16 percent of respondents have an annual income between 50000 to 100000, 4 percent of respondents are earning more than I lakh annually.

Table 4.9-Social media usage of respondents

Classification	No. of Respondents	Percentage
Instagram	40	40
Facebook	15	15
LinkedIn	3	3
Whatsapp	26	26
Youtube	16	16
Pinterest	0	0
Total	100	100

From the above table, it is clear that, 40 respondents are using Instagram for conducting business. 26 of them are using WhatsApp for conducting business. 3 respondents are using LinkedIn and no one is using Pinterest for conducting business.

Table 4.10-Time spend on social media per day for business

From the below table it is clear that, 24 percent of respondents spend less than one hour on social media per day for business, 54 percent of respondents spend 1 to 5 hours on social media per day for business, 20 percent of respondents spend 5 to 10 hours on social media per day for business, 2 percent of respondents spend more than 10 hours on social media per day for business.

<b>Classification</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Less than 1 hour	24	24
1-5 hours	54	54
5-10 hours	20	20
More than 10hours	2	2
<b>Total</b>	<b>100</b>	<b>100</b>

Table 4.11-Mode of using social media

<b>Classification</b>	<b>No. of respondents</b>	<b>Percentage</b>
Mobile phone	56	56
Laptop	38	38
Tablet	6	6
<b>Total</b>	<b>100</b>	<b>100</b>

From the above table, it is clear that, 56 respondents are using mobile phone as the mode of accessing social media, 38 respondents are using laptop as the mode of accessing social media and 6 respondents are using tablet as the mode of accessing social media for doing business.

Table 4.12-Marketing strategies used for conducting business through social media

<b>Classification</b>	<b>Frequency</b>	<b>Percentage</b>
Posting photos and videos related to business	44	44
Offering discounts	23	23
Giveaway	16	16
Engaging in comments and develop friendly network	9	9
<b>Total</b>	<b>100</b>	<b>100</b>

From the above table and figure it is clear that, the marketing strategy of 44 respondents are posting photos and videos related to business, 23 respondents are offering discounts through social media, 16 respondents are providing giveaways, 9 respondents are engaging in comments and develop a friendly.

Table 4.13-Store of Respondents

<b>Classification</b>	<b>No. of the Respondents</b>	<b>Percentage</b>
Physical Store	26	26
No Store	74	74
<b>Total</b>	<b>100</b>	<b>100</b>



From the above table and figure it is clear that, 74 percent of respondents have no physical store and 26 percent of respondents have a physical store.

## PART II- LIKERT SCALE

Table 4.15- Factors that influence women entrepreneurs to use social media as business platforms

Factors	W	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	W.M
		5	4	3	2	1		
Wide reach of customers		45	32	18	2	2	100	4.13
	F	225	128	54	4	2	413	
Large opportunities		36	54	7	1	2	100	4.21
	F	180	216	21	2	2	421	
Instant feedback		30	48	18	1	2	100	4.0
	F	150	192	54	2	2	400	
Popularity and fame		40	40	17	2	1	100	4.56
	F	200	200	51	4	1	456	
Inexpensive		39	47	11	2	1	100	4.21
	F	195	188	33	4	1	421	
Convenience		37	43	16	2	2	100	4.11
	F	185	172	48	4	2	411	
Easy advertising		52	35	10	2	1	100	4.35
	F	260	140	30	4	1	435	

The table shows the factors that influence by women entrepreneurs while using social media for business. First rank given to the popularity and fame. Rank 2 is for Easy advertising. Third rank given by women entrepreneurs in expensive and large opportunities.

Table 4.16-Problems faced by respondents

Factors	W	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	W.M
		5	4	3	2	1		
Doubt the credibility	F	40	48	9	2	1	100	4.24
		200	192	27	4	1	424	
Time consuming	F	30	58	4	6	2	100	4.08
Cyber bullying		150	232	12	12	2	408	
Limited face to face contact	F	33	42	18	5	2	100	3.99
		165	168	54	10	2	399	
Problems faced in finding sponsors	F	35	47	11	6	1	100	4.09
		175	188	33	12	1	409	
	F	40	50	7	2	1	100	4.26
		200	200	21	4	1	426	

The above table shows the problems faced by women entrepreneurs while using social media for business. First rank given to the problems faced by finding sponsors. Second rank is for time consuming and limited face to face contact. Third rank for the credibility and efficiency of social media marketing.

**HYPOTHESIS 1**

H0: There is no Significance difference between demographic variable Age with Factors that

influence by Women entrepreneurs towards the use of social media marketing for business.

H1: There is Significance difference between demographic variable Age with Factors that influence by Women entrepreneurs towards the use of social media marketing for business.

Table 4.17

ANOVA					
Age of Respondents					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	69.253	4	17.313	243.795	.00
Within Groups	6.747	95	.071		
Total	76.000	99			

Interpretation: The above table showing the value as per the one-way ANOVA test is 0.000, it is smaller than the 0.05 level of significance. So accept H1. There is significance difference between Age of the respondent with Factors that influence by Women entrepreneurs towards the use of social media marketing for business.

## HYPOTHESIS 2

H0: There is no Significance difference between demographic variable Education level with Problems faced by Women entrepreneurs towards the use of social media marketing for business.

H1: There is Significance difference between demographic variable Education level with Problems faced by Women entrepreneurs towards the use of social media marketing for business.

Table 4.18

ANOVA					
Age of Respondents					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	69.253		17.31	243.795	.000
Within Groups	6.747	9	.07		
Total	76.000	9			

## SUMMARY

Social media is a recent phenomenon that has changed how the business environment operates. It has been a blessing in disguise for all those women who have the potential to do things differently. Social media has thus played an important role in economically empowering women. The present study has been conducted to understand the adoption of social media marketing by women entrepreneurs in Ernakulam District and the platforms used by them. It was mainly based on primary data which was collected from 100 women entrepreneurs in Ernakulam through structured questionnaire. The collected data was analyzed through statistical tools like Likert and Simple Percentage method. The analyzed data were presented using tables and graphs

## FINDINGS

76 percent of the entrepreneurs are belonging to age group below 25,16 percent belong to 26-30 age group, 2 percent belong to 31-35 age group, 4 percent belong to 36-40 age group and 2 percentages is above 40.4 percent of the entrepreneurs have SSLC education,2 percent are Higher secondary, 52 percent are graduated. 40 percentage post graduated, 2 percent of entrepreneurs belong to others. 34 percent of women entrepreneurs are doing Art and Craft business, 26 percent are doing business based on fashion and 4 percent of entrepreneurs are doing Rental business.58 percent of women entrepreneurs are doing business without employees and 16 percent of them have more than 3 employees.64 percent of women entrepreneurs have started the business with their personal savings and 8 percent of

entrepreneurs' initial capital is from financial institution.64 percent of respondents have an annual income between 10000 to 50000 and only 4 percent of them are earning more than 1 lakh annually 40 respondents are using Instagram for conducting business and only 30 them are using LinkedIn 46 percent of women entrepreneurs are using social media for 1 to 2 years for conducting business.54 percent of women entrepreneurs spend 1 to 5 hours on social media per day for business. 46 women entrepreneurs are using mobile phone and only 2 of them are using tablet as the mode of accessing social media for doing business. The marketing strategy of 44 w o m e n entrepreneurs are posting photos and videos related to business on social media and only 8 respondents are engaging in comments and develop a friendly network.

74 percent of women entrepreneurs have no physical store and 26 percent of respondents have a physical store. Women entrepreneurs having store, 23 percent of respondents started physical store for the first a n d 77 percent of respondents started online store for the first time. The value as per the one-way ANOVA test is 0.000, it is smaller than the 0.05 level of significance .so accept H1. There is significance difference between Age of the respondent with Factors that influence by Women entrepreneurs towards the use of social media marketing f or business. Showing the value as per the one-way ANOVA test is 0.000, it is smaller than the 0.05 level of significance. So accept H1. There is significance difference between Age of the respondent with problems faced by Women entrepreneurs towards the use of social media marketing for business.

## **SUGGESTIONS FOR FURTHER STUDY**

Arrange training programs for women, at nominal or no fees to train them regarding the use of social media platforms for business. Help desk, websites and support forums can help in getting instant help. Conferences, workshops, seminars, and webinars can be organized for encouraging women. Certain policies and rules are required to be made for solving the problems faced by women entrepreneurs while using social media for business.

## **CONCLUSION OF THE STUDY**

The use of social media platforms and tools by women entrepreneurs has been seen as a very positive and progressive step, by chatting and interacting in a very positive way in terms of negotiating business activities. Social Media has enabled them the luxury of being able to

adequately manage their time and daily tasks enabling them to represent in all aspects of daily developments of their family and business. The modern woman entrepreneur is finding it very necessary to embrace and adapt technology in their daily lives and business ventures and incorporate social media as a marketing tool. From this study it is observed that woman entrepreneurs seem to have actively embraced social media to unlock their potentials for business success.

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## **A STUDY ON CONSUMER AWARENESS TOWARDS CHIT FUNDS OF KSFE LIMITED IN ERNAKULAM DISTRICT**

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### **ABSTRACT**

Chit funds is a type of saving and credit association system practiced in India, Sri Lanka, Pakistan and other Asian countries. It is an investment avenue which provides the return on capital and credit facility to the subscribers. The Kerala State Financial Enterprises Limited also known as KSFE is a Non-Banking and is fully owned by the Government of Kerala. The purpose of the study is to understand consumer perception towards chit fund operations, products and services of KSFE Ltd. The study is to determine various factors that influence the customers of KSFE Ltd to join the various schemes provided by the company. The study also helps to find out the level of consumer awareness towards the products and services offered by the company. The customers were people residing in Kerala as well as Non-residents. Demographic factors like gender, age, occupation and other factors like experience, credit facility, service quality had significant influence on the customers.

**(Keywords: KSFE chit funds, consumer perception, consumer awareness, savings)**

## **INTRODUCTION**

A 'chit fund' or 'chitty' is a contract between the foreman and the subscribers. As per the contract, each subscriber agrees to remit a fixed amount of money in specific intervals for a specific period. KSFE started its operation on 6<sup>th</sup> November 1969 with headquarters at Thrissur, with a capital of 2 lakhs with 45 employees and 10 branches. Now it has a paid-up capital of Rs 100 cr, with 7500 employees and 625 branches. The chit fund is a popular investment and borrowing option for both households and all categories of people. It helps to promote financial inclusion in rural areas. It contributes substantially to the State Government. KSFE is one of the profit-making companies of Kerala government. Consumer perception is defined as a process by which consumers sense a marketing stimulus, and organize, interpret, and provide meaning to it. This study helps us to find out the level of consumer awareness to products and services and also helps to know the consumer perception towards chit funds of KSFE Ltd.

## **STATEMENT OF THE PROBLEM**

This research work is conducted with aim to understand the consumer perception towards chit fund operations, products and services of KSFE Ltd. The study examines the various factors influencing the consumers for selecting the chit fund schemes of KSFE with the help of primary data collected from customers of KSFE. The study also measures the level of awareness among consumers towards the products, services and operations of the company.

## **OBJECTIVES OF THE STUDY**

1. To evaluate consumer perception towards the chit fund operations and the products and services of KSFE Ltd.
2. To study level of the consumer awareness of subscribers of KSFE chit funds.

## **SCOPE OF THE STUDY**

The scope of the study is limited to customers of various branches in Ernakulam District of Kerala. The study includes customers residing in Kerala as well as Non-Resident Indians.



## **RESEARCH METHODOLOGY**

The study is conducted with customers of KSFE chit funds in Ernakulam District of Kerala. For the present study 200 respondents are selected at random who are chit fund subscribers of KSFE. Convenience sampling method is used. Primary data is collected through questionnaire and secondary data is collected from journals, articles, internet etc. Simple percentage analysis is used for data analysis.

## **REVIEW OF LITERATURE**

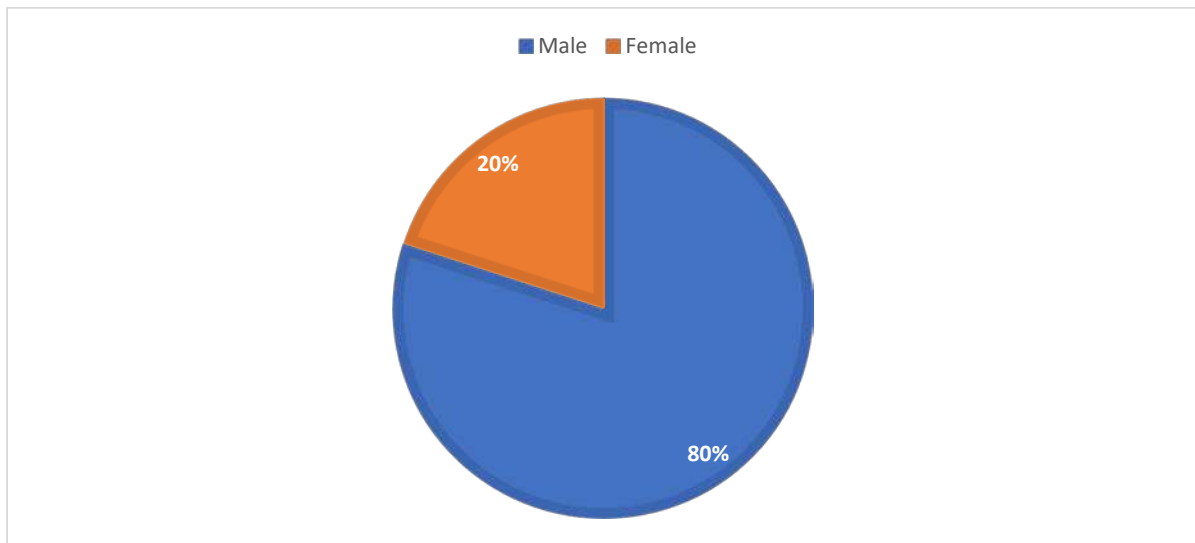
**Sankararaman(2012):** This paper shows the importance given by the people towards chit funds in Chennai city also said that People have good knowledge and confidence about chit fund. It has reached the people because of the simple method and systems. The statistical tool concluded that income and age is one of the important factors in deciding about the savings in chit fund.

**Preethi Rao (2007):** In this paper mainly focus about Chit fund and small business. It is greater financial sources for small business; it has been suffered by the money lenders with their high cost of loans and banks with their strong procedures. They can save the money in chit funds while in any emergency need for money. It also explains chit funds are more suitable financing model for small business mainly because they do not require filing of income tax returns and other accurate certification.

**Prof. Mudit Kapoor (2007):** opined that the chit funds are an essential for small businesses and low income households. Registered chit funds are not considered about low value chit schemes due to increased operational costs and stringent rules imposed by Government. Chit funds are very safe method for both financing and saving. They are providing loans at lower interest rates than money lenders and banks.

## DATA ANALYSIS & INTERPRETATION

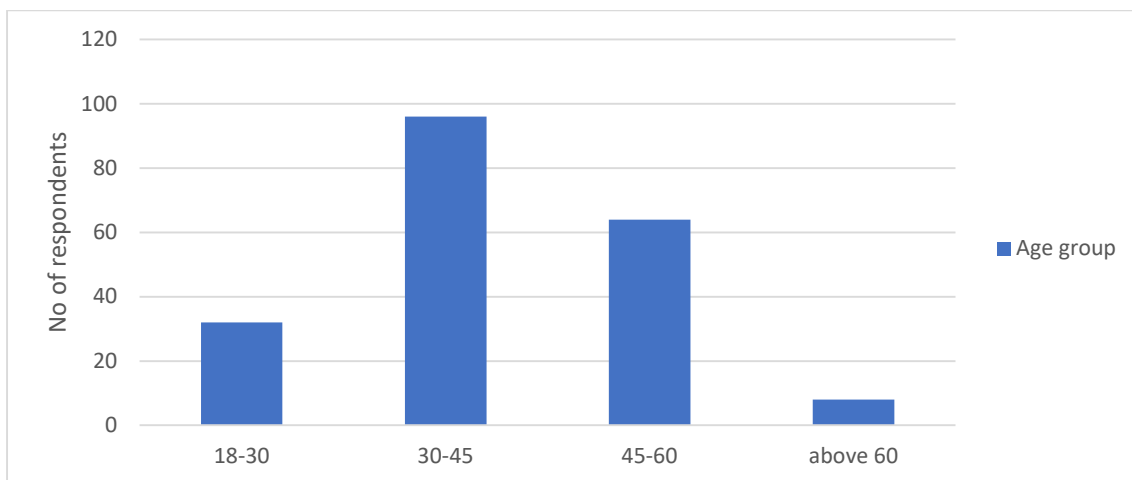
**Figure 1: Figure showing the gender of customers**



### Interpretation

As depicted in Figure 1, 80% of the customers of KSFE are males and 20% are females.

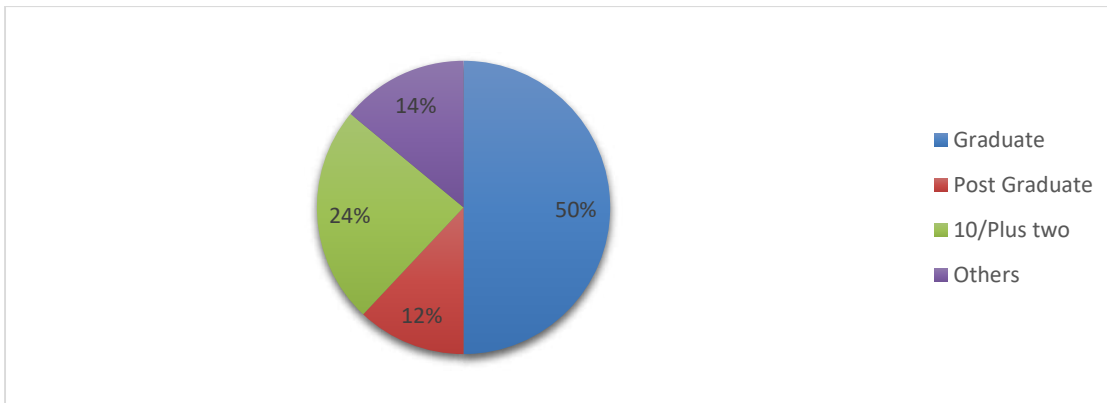
**Figure 2: Figure showing age group of subscribers**



### Interpretation

As can be inferred from Figure 2, 48% of the customers of KSFE belong to age group between 30-45 and 32% belong to age group between 45-60. 16% of customers belong to age group of 18-30 and 4% to age group above 60.

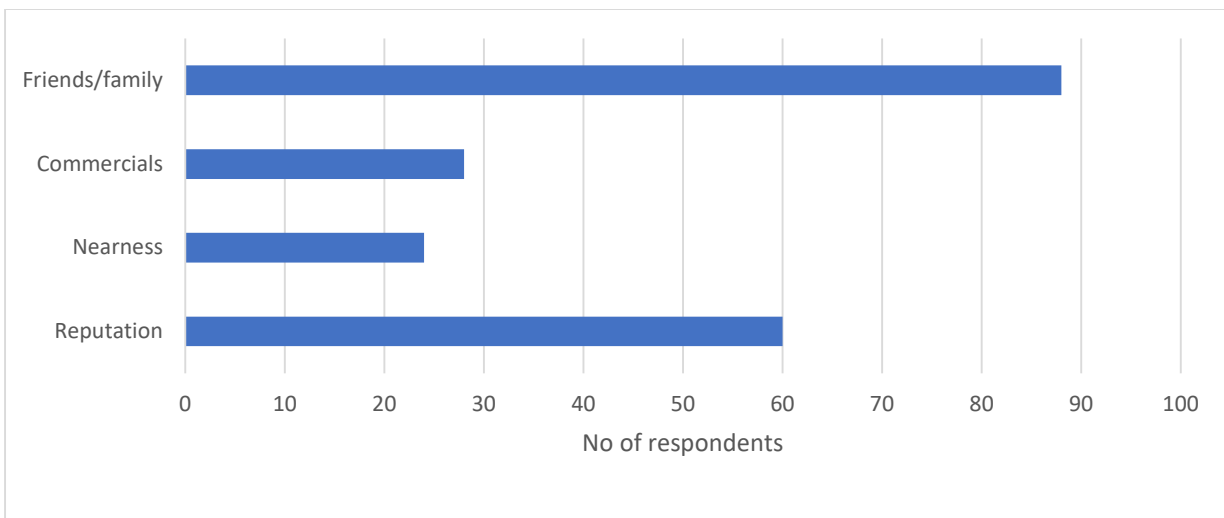
**Figure 3: Figure showing educational qualification of subscribers**



**Interpretation**

As depicted in fig 3, 50 % of the customers of KSFE are graduates and 24% of them are qualified 10/plus two. 12% of the customers are post graduates and 14% are included in other category.

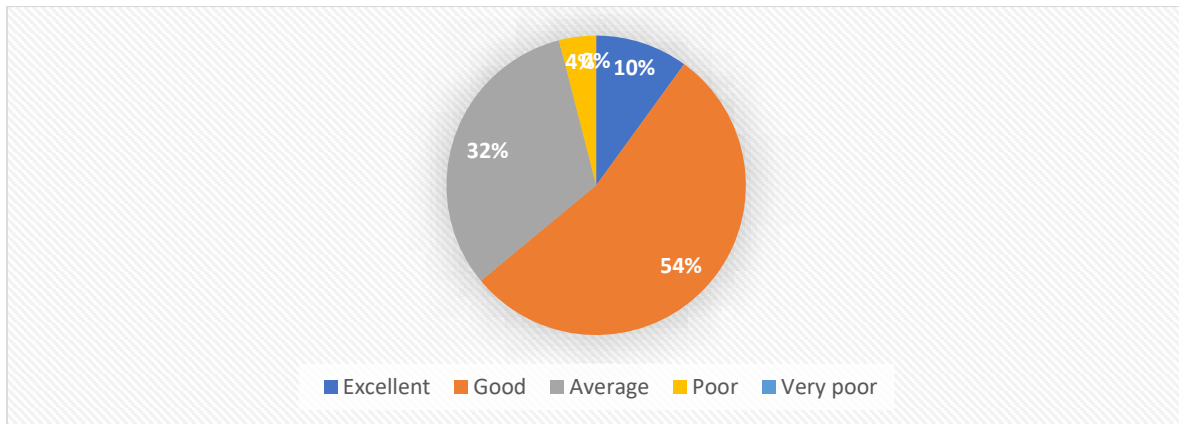
**Figure 4: Figure showing what induced customers to select KSFE chit funds**



**Interpretation**

As can be inferred from Figure 4, 44% of the customers have been induced to join KSFE chit funds due to friends/family and 30% of them joined due to the company reputation. 14% of the customers were induced by commercials and 12% by the nearness of the branch.

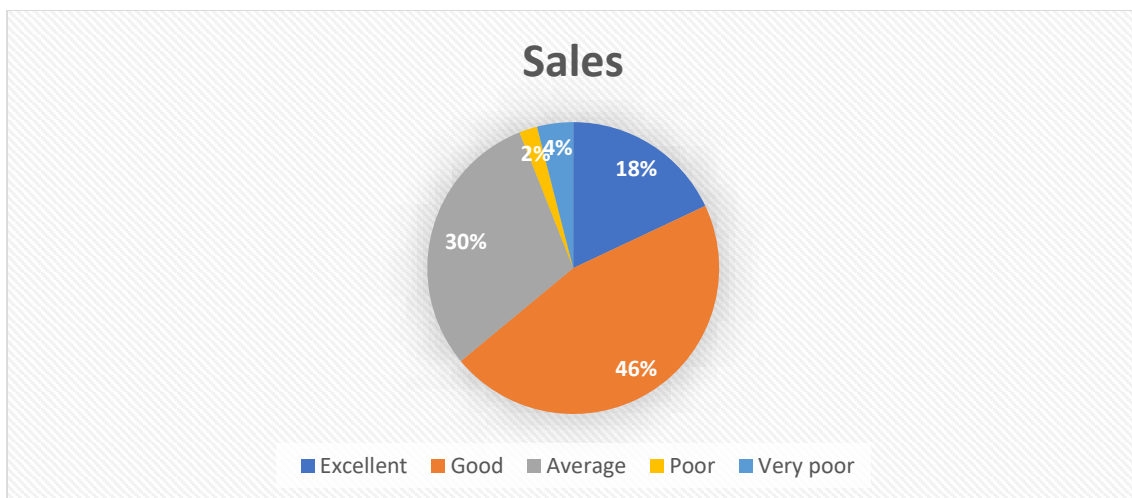
**Figure 5: Figure showing customers rating towards credit facility**



**Interpretation**

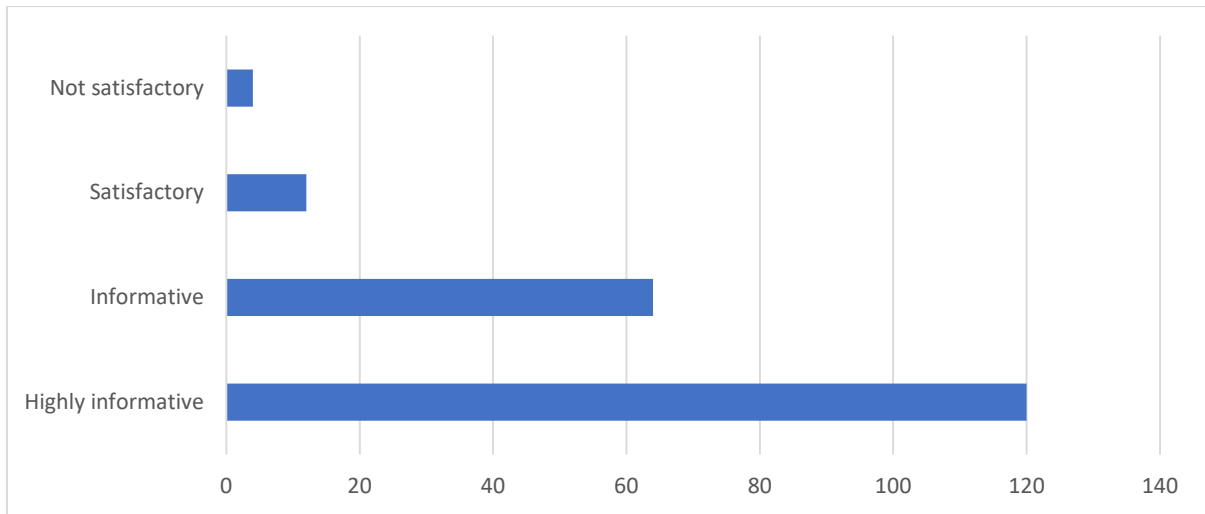
As shown in Figure 7, 54% of the customers rated the credit facility as good and 32% of them rated it as average. 10% of the customers rated the credit facility as excellent and 4% of them rated it as poor.

**Figure 6: Figure showing customers rating towards online payment mechanism**



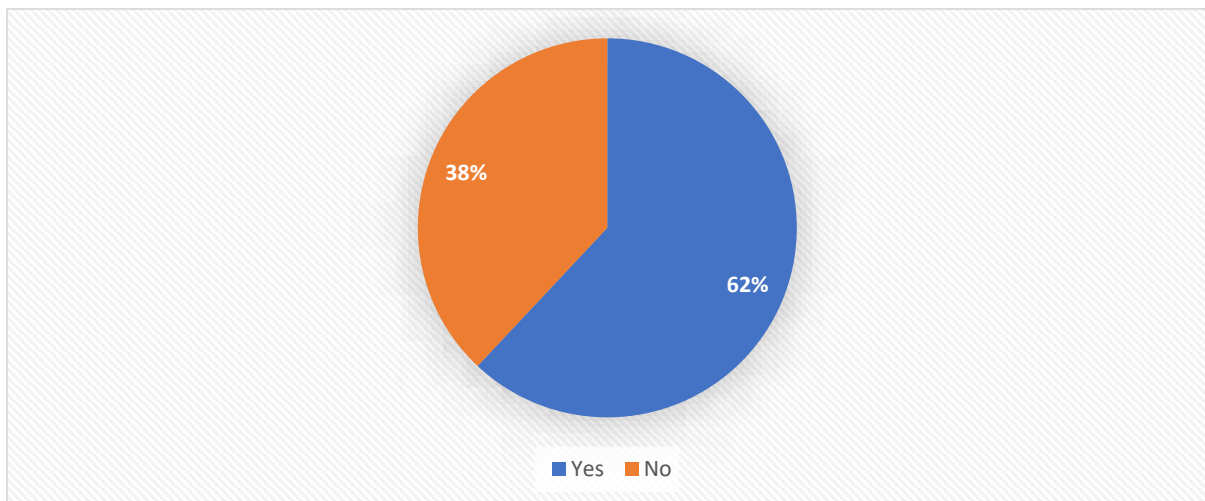
**Interpretation:** As depicted in Figure 8, 46% of customers rated the online payment mechanism as good and 30% rated as average. 18% of them rated it as excellent, 2% customers rated it as poor and 4% as very poor.

**Figure 7-Figure shows whether product manual provided by KSFE is informative**



**Interpretation:** As can be inferred from Figure 13, 60% of the customers agrees that the product manual provided by the branch is highly informative and 32% agrees that it is informative. 6% of them agrees it is satisfactory and 2% of them as not satisfactory.

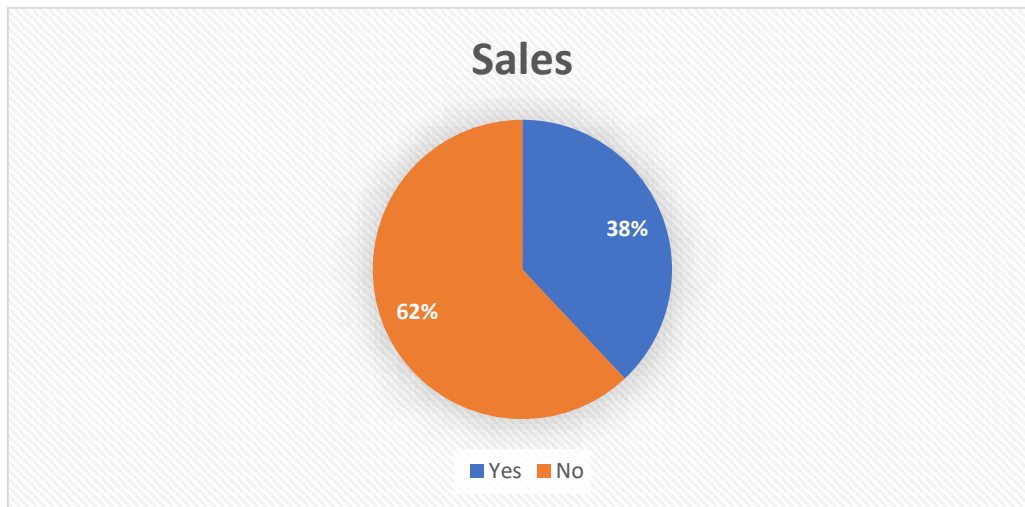
**Figure 8-Figure showing customers awareness towards KSFE multi division chitty**



**Interpretation**

As shown in Figure 14, 62% of the subscribers are aware about the Multi division chitty and only 38% are not aware about it.

**Figure 9 Figure showing customers awareness towards KSFE New Bhadratha chitty**



**Interpretation:** As shown in Figure 15, only 38% of the customers are aware about the New Bhadratha chitty and 62% are not aware about it.

### **FINDINGS, SUGGESTIONS AND RECOMMENDATIONS:**

From this research work it has been found that 80% of the respondents are males and 20% are females. 48% of the respondents are in the age category between 30-45. The company should also try to attract more people. Half of the respondents are salaried employees, the company should expand its customer base. 44% of the respondents were induced by friends/family to join KSFE chit funds. It should try to set up branches in more convenient locations and attract customers through advertisements. 40% of the respondents have joined the 10lakh scheme, company should improve subscriptions in other schemes. 64% of the respondents rated service quality as good and 20% rated it as excellent. 54% of the respondents have rated credit facility as good and 10% rated it as excellent. Only 46% of the respondents rated online payment mechanism as good, hence company should improve the payment options. Majority of the respondents are satisfied with agent facility provided by KSFE. 60% of the respondents are satisfied with the return from chit funds and 6% are highly satisfied, 54% of the respondents are satisfied with discount percentage of prize money and 30% are neutral, hence company should maintain an ideal discount rate. 44% of the respondents are satisfied with the Suguma deposit scheme, so the company should improve the interest rates. 60% of the customers responded product manual provided by the company is highly informative. 62% of the respondents are aware about KSFE Multi division chitty. 38% of the respondents

are aware about the KSFE New Bhadratha chitty and company should be able to improve the consumer level of awareness on this particular scheme. 46% of the respondents had an overall satisfaction level of 4 towards KFSE chit funds and 36% had satisfaction level of 3.

## **CONCLUSION:**

This research work is conducted on the topic 'A study on consumer perception towards chit funds of KSFE Limited in Ernakulam District'. It helps us to evaluate consumer perception towards the chit fund operations, products and services of KSFE Ltd and to study level of the consumer awareness of subscribers of KSFE chit funds. The study helps to understand the various factors influencing the customers of KSFE Ltd. These factors contribute towards customer retention, reputation etc. of the company. The consumer perception and consumer awareness are the key factors that helps the company to attract, retain and grow customers. These factors should be considered while making new products. The company should try to set up branches in more convenient areas and also try to attract customers with their advertisements. From the study it is understood that consumer perception and consumer level of awareness plays a major role in developing customer base and improving the overall business of KSFE.

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## **A STUDY ON FUNDAMENTAL ANALYSIS OF REALTY SECTOR COMPANIES LISTED IN NSE**

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### **ABSTRACT**

Fundamental analysis is used for finding out the long-term predictions of values of future phenomena based on historical data and any factors likely to affect the level of supply and demand. The final result of its use is an appraisal the true value of the subject of valuation, or so-called fundamental value. Using this method to analyze, diagnose, forecast and positively influences the process of taking investment measures and leads to a better understanding of the real estate market. It can be stated that the Real Estate sector companies are one most promising platform of investment in capital market and in turns give considerable return for the risk taken by investors.

**(Key Words: Fundamental analysis, real estate, Investors)**

### **INTRODUCTION**

Fundamental analysis is the study of the various factors that effect a company's earnings and dividend. Here it is the study on fundamental analysis of selected real estate company's listed in NSE. Fundamental analysis studies the relationship between a company's share price and the various elements of its financial position and performance. It is based on the theory that

the market price of a security tends to move towards the its “real value” or “intrinsic value” At the company level, fundamental analysis may involve examination of financial data, management, business concept and competition. At the industry level, there might be an examination of supply and demand forces of the products. For the national economy, fundamental analysis might focus on economic data to assess the present and future growth of the economy.

To forecast future stock prices, fundamental analysis combines economic, industry, and company analysis to derive a stock’s fair value called intrinsic value. If fair value is not equal to the current stock price, fundamental analysts believe that the stock is either over or under valued. As the current market price will ultimately gravitate towards fair value, the fair value should be estimated to decide whether to buy the security or not. The aim of the following study is to describe the possibility of applying fundamental analysis on the real estate market, based on the principles existing on capital markets.

## **STATEMENT OF THE PROBLEM**

The study will help to know what strategies the investor can adopt while trading in equity market with the help of fundamental analysis. Fundamental Analysis is the upcoming tool and helps the investor to know how the company is fundamentally strong and who want to invest in a systematic manner in the competitive world, the study reveals the importance for the investment decision which acts as guidance and helps them in decision making and predicts the figure price of the scrips.

## **SIGNIFICANCE OF STUDY**

The study is based on fundamental analysis of selected real estate companies listed in NSE. This study is to give investors an insight about the future growth of the company and help them in taking future investment decision which may be to buy or sell the shares of the particular company. This study involves fundamental analysis starting from analyzing the macro economic situation of the concerned country or countries, followed by analysis of the real estate industry in India and then analyzing company’s business model

## **OBJECTIVES OF THE STUDY**

- To find out the intrinsic value of Real estate company from 2021-2022.
- To provide suggestions to new investors and stock holders whether to buy new shares or sell the existing shares.

## **METHODOLOGY AND DATA COLLECTION**

### **A. SCOPE OF STUDY**

This study is conducted based on the selected real estate companies listed in NSE. The companies are selected according to their market capitalization.

### **B. SAMPLING PLAN**

Real estate company, DLF (Delhi Land & Finance) and Godrej Properties which is the top listed in National Stock Exchange has been selected for the purpose of study.

### **C. TOOLS USED FOR THE STUDY**

Ratio analysis used for the purpose of analysis.

- Earnings per share(EPS), EBITDA margin, EBIT margin, Profit after tax (PAT margin), Return on asset
- Return on equity (ROE), Total debt or equity ratio, Current ratio, Quick ratio, P/E ratio, P/B ratio

## **REVIEW OF LITERATURE**

Vanstone B.Finnie G. and Tan C (2004) conducted a study entitled-“Enhancing Security Selection in the Australian Stock Market Using Fundamental Analysis and Neural Network”. This paper examines financial trading from the aspect of security selection. This paper also examines the practice of fundamental analysis and demonstrates how neural networks can be practically employed to enhance the fundamentalist selection process.

Jim Burg (1999) conducted a study- “Fundamental Analysis Using Internet”. This study examined the fundamental analysis looks at the fundamental issues that drive the value of the

particular company. The objective was to identify companies that may be considered undervalued in the market with a view to investing when the time is right. In this study, Jim berg outlined more about what fundamental analysis is and how it could be used.

Jon Lynch (1999) conducted a study, “Share market Analysis-Fundamental vs Technical Analysis”, which reveals that in recent times, there has been a bigger push towards stock market research, which is being conducted by private individuals. This article explains the difference between the fundamental and technical analysis.

## **FUNDAMENTAL ANALYSIS**

Fundamental analysis is a technique that attempts to determine a security’s value by focusing on underlying factors that affect a company’s actual business and its future prospects. On a broader scope, you can perform fundamental analysis on industries or the economy as a whole the term simply refers to the analysis of the economic well-being of a financial entity as opposed to only its price movements.

Fundamentals: Quantitative and Qualitative

- Quantitative – capable of being measured or expressed in numerical terms.
- Qualitative - related to or based on the quality or character of something, often as opposed to its size or quantity.

**INTRINSIC VALUE:** Intrinsic value has two primary connotations in the finance world. In the option trading world, the term refers to the difference between the option’s strike price and the market value of the underlying security.

**ECONOMIC ANALYSIS: INDUSTRIAL GROWTH:** The Indian real estate industry, which is currently worth about US\$ 12 billion, plays a significant role in contributing to the economy of the country. The real estate industry in India ranks second in the world in terms of generating employment for the people of India and contributing to the Gross Domestic Product of the country. Presently real estate accounts for about 5% of India's GDP; in the next five years it is expected to rise up to 6%.

**MARKET SIZE:** By 2040, real estate market to grow to Rs. 65,000 core (US\$ 9.30 billion) from Rs 12,000 crore (US\$ 1.72 billion) in 2019. Real estate sector in India is expected to

reach a market size of US\$ 1 trillion by 2030 from US\$ 120 billion in 2017 and contribute 13 per cent of the country's GDP by 2025.

**TYPE OF ECONOMY:** The economy of India is a developing mixed economy. It is the world's seventh-largest economy by nominal GDP and the third-largest by purchasing power parity (PPP). The country ranks 139th in per capita GDP (nominal) with \$2,734 and 122nd in per capita GDP (PPP) with \$7,783 as of 2018. After the 1991 economic liberalization, India achieved 6-7% average GDP growth annually.

**GROSS DOMESTIC PRODUCT (GDP):** The OECD defines GDP as "an aggregate measure of production equal to the sum of the gross values added of all resident and institutional units engaged in production"

### **SAVINGS AND INVESTMENT**

Saving is defined as personal disposable income minus personal consumption expenditure. In other words, income that is not consumed by immediately buying goods and services is saved. Investment is the production per unit time of goods which are not consumed but are to be used for future production.

### **INFLATION**

The inflation rate is determined by fluctuations in the price of goods and services in an economy. Inflation is dictated by the cost of credit.

### **GOVERNMENT BUDGET**

A government budget is an annual financial statement presenting the revenues and spending for a financial year.

### **POLITICAL STABILITY**

The standard definition of political instability is the propensity of a government collapse either because of conflicts or rampant competition between various political parties. Political instability tends to be persistent.

## **INFRASTRUCTURE**

Infrastructure sector is a key driver for the Indian economy. The sector is highly responsible for propelling India's overall development and enjoys intense focus from Government for initiating policies that would ensure time-bound creation of world class infrastructure in the country.

## **INTEREST RATES**

An interest rate is the amount of interest due per period, as a proportion of the amount lent, deposited or borrowed. It is the rate a bank or other lender charges to borrow its money, or the rate a bank pays its savers for keeping money in an account.

## **UNEMPLOYMENT**

According to the National Sample Survey Office (NSSO) report, the unemployment rate was at an all-time high of 6.1 per cent in 2017-18. The report also says that male youth had an unemployment rate of 17.4 percent and 18.7 percent in rural and urban areas, while women youth had rates of 13.6 percent and 27.2 percent respectively in 2017-18.

## **CURRENT ACCOUNT DEFICIT**

The current account deficit is a measurement of a country's trade where the value of the goods and services it imports exceeds the value of the goods and services it exports.

## **MONETARY POLICY**

Monetary policy is the process by which the monetary authority of a country, generally the central bank, controls the supply of money in the economy by its control over interest rates in order to maintain price stability and achieve high economic growth.

## **BALANCE OF PAYMENT**

The balance of payments is the record of all international trade and financial transactions made by a country's residents. The balance of payments has three components. They are the current account, the financial account and the capital account.

## **INDEX OF INDUSTRIAL PRODUCTION**

The Index of Industrial Production (IIP) is an index for India which details out the growth of various sectors in an economy such as mineral mining, electricity and manufacturing.

## **PURCHASING MANAGERS INDEX**

The purpose of the PMI is to provide information about current business conditions to company decision makers, analysts and purchasing managers.

## **FISCAL DEFICIT**

The difference between total revenue and total expenditure of the government is termed as fiscal deficit. Generally fiscal deficit takes place either due to revenue deficit or a major hike in capital expenditure.

## **PORTER'S FIVE FORCES:**

1. Intensity of Industry Rivalry (Neutral to Favorable) 2. Threat of new entrants (Neutral to Unfavorable) 3. Threat of Substitutes (Favorable for End Use; Neutral for Investment) 4. Bargaining Power of Suppliers (Favorable) 5. Bargaining Power of Buyers (Neutral)

PESTEL Analysis: It is estimated that the size of the real estate sector may increase five-fold to reach USD676 Billion by 2025. Real estate firm DLF Ltd, Supertech Ltd, Jaypee infratech Ltd, Ansal Properties & infrastructure Ltd, Parasvanath developers Ltd, Unitech Omaxe Ltd and so on has been playing a significant role in shaping up the real estate since inception.

(4.1) RATIO ANALYSIS OF DLF LTD : INTERPRETATION : In 2018 EPS was low and in 2019 it decreased some more and in the year 2020 & 2021 It showed a high growth. In 2021 it again falls to a low level. High ratio indicates a potentially worthwhile investment depending on the market price of the stock.

(4.1.2) PBDIT MARGIN: INTERPRETATION: In 2018 PBDIT of DLF was good and in 2020 it had highest growth while comparing with other years. From 2020 it has shown a decreasing performance.

(4.1.3) PBIT MARGIN: INTERPRETATION: In 2018 the PBIT margin was good and in 2019 it shown a positive growth and from the year 2020 onwards it shown a declining trend. Lower margin could indicate a company is underpricing.

(4.1.4) PBT MARGIN: INTERPRETATION: In the year 2018 PBT was very low compared to coming years. In the year 2019& 2020, shown a slight growth and in 2021 it attained a huge growth and dropped down to a low level in 2022.

(4.1.5) ROA: INTERPRETATION: In the year 2018 ROA of the company was low win the year 2019 it again decreased. In the 2020 & 2021 it had a positive and reached the maximum in these 5 years. In 2022 it drastically decreased.

(4.1.6) CURRENT RATIO: INTERPRETATION: In the year the DLF had a high current ratio in the 2018 it had a shot decline and increased in the year 2020 and from here it shown a declining nature till the year 2022.

(4.1.7) DIVIDEND PAYOUT RATIO Table showing Dividend Payout ratio of DLF

<b>YEAR</b>	<b>DIVIDEND PAYOUT RATIO</b>
2018	47.71
2019	74.55
2020	0.3
2021	16.33
2022	9.24

Source: Profit & Loss account of DLF Ltd

INTERPRETATION: In the year 2018 the payout ratio was low and it increased in 2019 and in 2020 it reached zero. That means in 2020 there was no dividend distributed. In the year 2021 it regained growth and in 2022 it declined slightly.



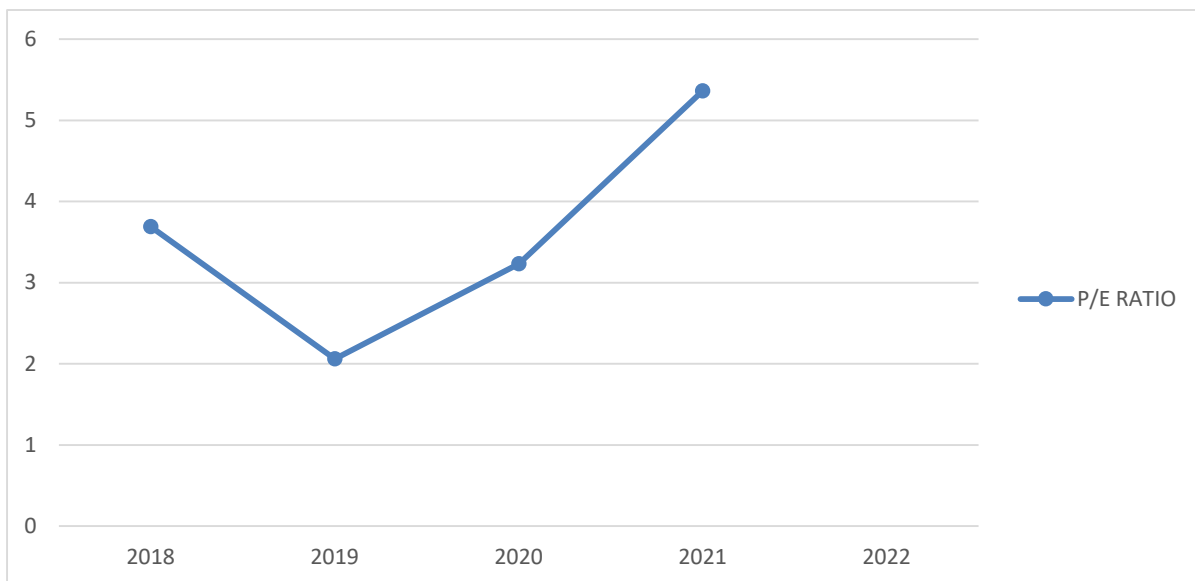
(4.1.8) PRICE TO BOOK VALUE: Table showing Price To Book value of DLF

YEAR	PRICE TO BOOKVALUE
2018	1.03
2019	0.85
2020	1.13
2021	1.02
2022	1.33

Source: Profit & Loss account of DLF Ltd

INTERPRETATION: In the year 2018 it had a good level of book value. In 2019 it shown a decline & in 2020 it increased and declined in 2021 and showed a positive growth in 2022

(4.1.9) PRICE TO SALES: Figure showing Price to sales of DLF



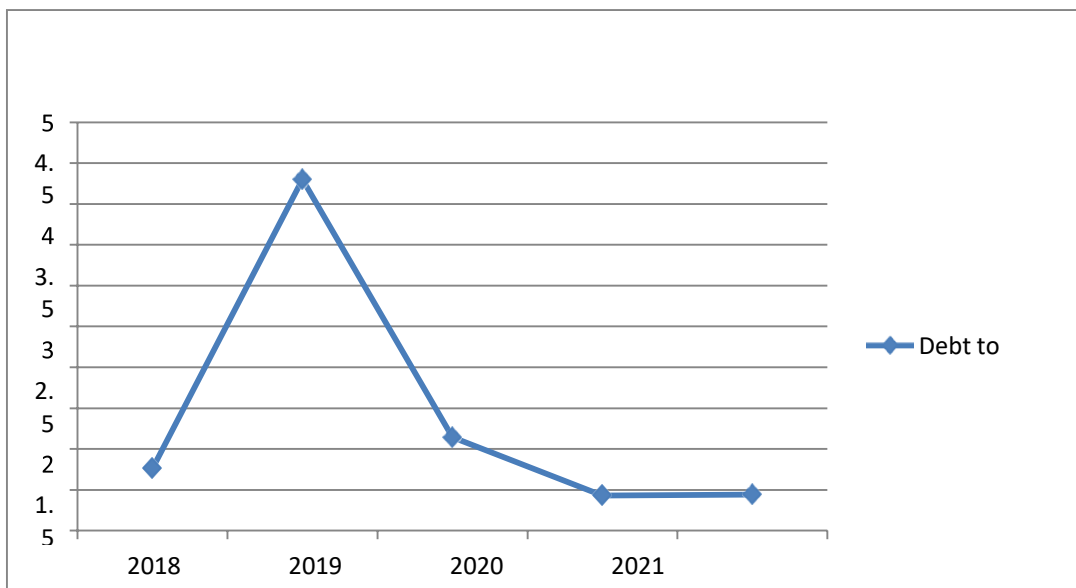
INTERPRETATION: In the ear the company had a good P/E ratio and in 2019 it declined and from 2020 to 2021 it maintained a positive growth & in 2022 it shown a stable level.

(4.1.10) EARNINGS YIELD:



INTERPRETATION: In 2018 the earnings yield was low and in 2019 it decreased and from the year 2020 it attained a positive growth and reached highest yield rate in 2021 of these 5 years and declined rapidly in 2022.

(4.1.11) DEBT TO EQUITY: Figure showing Debt to equity of DLF



INTERPRETATION: In the Debt to equity was low compared to next years. It attained a huge growth in 2020 and shown rapid decline and stability of low ratio in 2

<b>PARTICULARS</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
INCOME				
REVENUE FROM OPERATIONS [GROSS]	30.0	7.793	-12.1	9.7
REVENUE FROM OPERATIONS [NET]	30.0	7.79	-12.1	9.79
TOTAL OPERATING REVENUES	29.76	7.48	-12.3	9.37
Other Income	29.26	38.4	84.2	27.6
TOTAL REVENUE	29.73	9.45	-6.1	10.5
EXPENSES				
Operating And Direct Expenses	38.76	5.51	-5.1	50.73
Employee Benefit Expenses	-9.62	-5.8	-1.4	0.8
Finance Costs	16.317	29.34	28.07	-10.50
Depreciation And Amortisation Expenses	40.58	5.084	-2.066	-58.76
Other Expenses	6.42	0.2	-12.2	-7.0
TOTAL EXPENSES	25.42	11.59	4.5	13.8
PROFIT/LOSS BEFORE EXCEPTIO NAL, EXTRAORDIN ARY ITEMS AND TAX	76.08	-13.572	-121.58	-25.36
Exceptional Items	189.7	-732.4	-13014.	-287.5
PROFIT/LOSS BEFORE TAX	63.76	64.29	1274.	3.0
Current Tax	0.58	-25.10	-10.65	-83.27
Less: MAT Credit Entitlement	0	0	0	0
Deferred Tax	-142.5	-105.2	-924.2	-131.8
TOTAL TAX EXPENSES	258.0	45.50	2643.	76.0

**INTRINSIC VALUE:(4.1.12) Table showing calculation of percentage of growth**

PROFIT/LOSS AFTER TAX AND BEFORE EXTRAORDINARY ITEMS	-1.505	70.60	815.0	-21.4
PROFIT/LOSS FROM CONTINUING OPERATIONS	-9.471	56.8	741.0	-27.8
PROFIT/LOSS FOR THE PERIOD	-9.471	56.8	741.0	-27.8
Minority Interest	-96.69	-79.57	-138.8	-84.5
CONSOLIDATED PROFIT/LOSS AFTER M & ASSOCIATES	-43.32	32.3	726.2	144.1
Basic EPS (Rs.)	-33.33	33.3	733.3	133.3
Diluted EPS (Rs.)	-33.3	33.3	700	100
Equity Share Dividend	54.39	-99.24	57.68	-72.4
Tax On Dividend	-100	-100	-100	-72.18

**(4.1.14) Table showing calculation of average growth**

Average growth = total/number of years

<b>PARTICULARS</b>	<b>AVERAGE</b>
INCOME	
REVENUE FROM OPERATIONS [GROSS]	8.890471238
REVENUE FROM OPERATIONS [NET]	8.890471238
TOTAL OPERATING REVENUES	8.579202037
Other Income	44.91327199
TOTAL REVENUE	10.88993727
EXPENSES	
Operating And Direct Expenses	22.46866371
Employee Benefit Expenses	-4.050083137
Finance Costs	15.80781818
Depreciation And Amortization Expenses	-3.791369151
Other Expenses	-3.15411843
TOTAL EXPENSES	13.86350712
PROFIT/LOSS BEFORE EXCEPTIONAL, EXTRAORDINARY ITEMS AND TAX	-21.10954328
Exceptional Items	-3461.297333
PROFIT/LOSS BEFORE TAX	351.4836831
Current Tax	-29.61216982
Less: MAT Credit Entitlement	0
Deferred Tax	-325.9597212
TOTAL TAX EXPENSES	755.79901
PROFIT/LOSS AFTER TAX AND BEFORE EXTRAORDINARY ITEMS	215.668969
PROFIT/LOSS FROM CONTINUING OPERATIONS	190.1363743
PROFIT/LOSS FOR THE PERIOD	190.1363743
Minority Interest	-99.90990991
CONSOLIDATED PROFIT/LOSS AFTER MI AND ASSOCIATES	214.868667
OTHER ADDITIONAL INFORMATION	
Basic EPS (Rs.)	216.6666667
Diluted EPS (Rs.)	200
DIVIDEND AND DIVIDEND PERCENTAGE	
Equity Share Dividend	-14.89723381
Tax On Dividend	-93.04739336

**(4.1.15) Table showing calculation of forecasted values for the year 2022**

Forecasted value = (100+average growth)/100+value for the year 2022

<b>PARTICULARS</b>	<b>CALCULATED VALUE</b>
INCOME	
REVENUE FROM OPERATIONS [GROSS]	74336.07497
REVENUE FROM OPERATIONS [NET]	74336.07497
TOTAL OPERATING REVENUES	71774.37637
Other Income	29791.87157
TOTAL REVENUE	98329.70847
EXPENSES	
Operating And Direct Expenses	111244.6009
Employee Benefit Expenses	-1424.090233
Finance Costs	32593.66608
Depreciation And Amortisation Expenses	-851.6552525
Other Expenses	-2907.655616
TOTAL EXPENSES	117993.4182
PROFIT/LOSS BEFORE EXCEPTIONAL, EXTRAORDINARY ITEMS AND TAX	-10941.70957
Exceptional Items	-440692.3765
PROFIT/LOSS BEFORE TAX	226935.44
Current Tax	-3217.658372
Less: MAT Credit Entitlement	0
Deferred Tax	-51025.73475
TOTAL TAX EXPENSES	209635.9714
PROFIT/LOSS AFTER TAX AND BEFORE EXTRAORDINARY ITEMS	79424.41123
PROFIT/LOSS FROM CONTINUING OPERATIONS	70021.52257
PROFIT/LOSS FOR THE PERIOD	70021.52257
Minority Interest	-514.536036
CONSOLIDATED PROFIT/LOSS AFTER MI AND ASSOCIATES	283454.7456
OTHER ADDITIONAL INFORMATION	
Basic EPS (Rs.)	1516.666667
Diluted EPS (Rs.)	1200
DIVIDEND AND DIVIDEND PERCENTAGE	
Equity Share Dividend	-2126.580127
Tax On Dividend	-2730.010521

**(4.1.16) Forecasted profit & loss account of DLF LTD for the year ended 31-3-2022**

<b>PARTICULARS</b>	<b>ESTIMATE DVALUE 2022</b>
INCOME	
REVENUE FROM OPERATIONS [GROSS]	82697.39497
REVENUE FROM OPERATIONS [NET]	82697.39497
TOTAL OPERATING REVENUES	80140.46637
Other Income	30455.19157
TOTAL REVENUE	107359.1185
EXPENSES	
Operating And Direct Expenses	116195.7009
Employee Benefit Expenses	-1072.470233
Finance Costs	34655.53608
Depreciation And Amortisation Expenses	-627.0252525
Other Expenses	-1985.795616
TOTAL EXPENSES	126504.4982
PROFIT/LOSS BEFORE EXCEPTIONAL, EXTRAORDINARY ITEMS AND TAX	-10423.37957
Exceptional Items	-440565.0565
PROFIT/LOSS BEFORE TAX	227581.09
Current Tax	-3108.998372
Less: MAT Credit Entitlement	-12.18
Deferred Tax	-50869.19475
TOTAL TAX EXPENSES	209913.3414
PROFIT/LOSS AFTER TAX AND BEFORE EXTRAORDINARY ITEMS	79792.68123
PROFIT/LOSS FROM CONTINUING OPERATIONS	70389.79257
PROFIT/LOSS FOR THE PERIOD	70389.79257
Minority Interest	-509.386036
CONSOLIDATED PROFIT/LOSS AFTER MI AND ASSOCIATES	284773.9456
OTHER ADDITIONAL INFORMATION	
Basic EPS (Rs.)	1523.666667
Diluted EPS (Rs.)	1206
DIVIDEND AND DIVIDEND PERCENTAGE	
Equity Share Dividend	-1983.830127
Tax On Dividend	-2700.670521

## Calculation of Intrinsic Value

COMPAN Y NAME	P/E RATIO	EPS	P/E RATIO*EPS	*20%	INTRENS IC VALUE	MP
DLF	25.0	1206	30174.12	6034.8	24139.2	359

INTERPRETATION: The current market value of DLF is less than the intrinsic value. So it is desirable to buy the shares of DLF Ltd from the view point of a potential investor. From the view point of an existing shareholder it is better to hold the shares.

### (4.2) GODREJ PROPERTIES LTD: Earnings Per Share Ratio (Eps)

YEAR	EPS
2018	9.58
2019	7.56
2020	9.60
2021	10.86
2022	11.16

Source: Profit & Loss account of Godrej Properties ltd

INTERPRETATION: In 2018 the EPS was good compared to the succeeding years. In 2019 the EPS decreased .In 2022 it increased and it kept increasing in the years 2021 and 2022.

### (4.2.2) PBDIT MARGIN: Table showing PBDIT Margin of Godrej Properties

YEAR	PBDIT
2018	17.09
2019	12.30
2020	17.15
2021	22.96
2022	25.41

Source: Profit & Loss account of Godrej Properties ltd

INTERPRETATION: In 2018 PBDIT was good and in 2019 it decreased and from the year it kept growing year after year continuously.



(4.2.3) PBIT MARGIN: Table showing PBIT Margin of Godrej Properties

<b>YEAR</b>	<b>PBIT</b>
2018	16.59
2019	11.65
2020	16.48
2021	22.22
2022	24.78

Source: Profit & Loss account of Godrej Properties ltd

INTERPRETATION: In 2018 PBIT Margin was good and in 2019 it decreased. In 2020 it increased more than the rate in the year 2018 and continued a growth till 2022.

(4.2.4) PBT MARGIN: Table showing PBT Margin of Godrej Properties

<b>YEAR</b>	<b>PBT</b>
2018	17.68
2019	9.95
2020	15.97
2021	17.51
2022	11.86

Source: Profit & Loss account of Godrej Properties ltd

INTERPRETATION: In 2018 was very high compared to the succeeding years. In 2019 it dropped and maintained a slow growth in the years 2020-2022. A low gross profit margin means your ratio percentage is below industry norms and potentially down from your company's prior periods.

(4.2.5) RETURN ON ASSET (ROA): Table showing Return On Asset of Godrej Properties

<b>YEAR</b>	<b>ROA</b>
2018	2.59
2019	2.41
2020	2.87
2021	3.29
2022	3.12

Source: Profit & Loss account of Godrej Properties ltd

INTERPRETATION: In 2018 ROA was good and in 2019 it decreased and in the later years 2020 and 2021 ROA grew positively. In 2022 it shown a decreasing trend. When ROA increases it increases sales and vice versa.

(4.2.6) CURRENT RATIO (CR): Table showing Current Ratio of Godrej Properties

<b>YEAR</b>	<b>CR</b>
2018	1.48
2019	1.61
2020	1.34
2021	1.28
2022	1.08

Source: Profit & Loss account of Godrej Properties ltd

INTERPRETATION: In 2018 current ratio was good and in 2019 it increased and shown a declining trend in the years 2020-2022. Current ratio is the proportion of current assets with current liabilities. The perfect state is at the proportion of 2:1.

(4.2.7) QUICK RATIO:

INTERPRETATION: In the year 2018 QR was good and in the year 2019 it attained a slow growth and in 2020 it declined and shown a high growth in 2021. In 2022 it again declined.

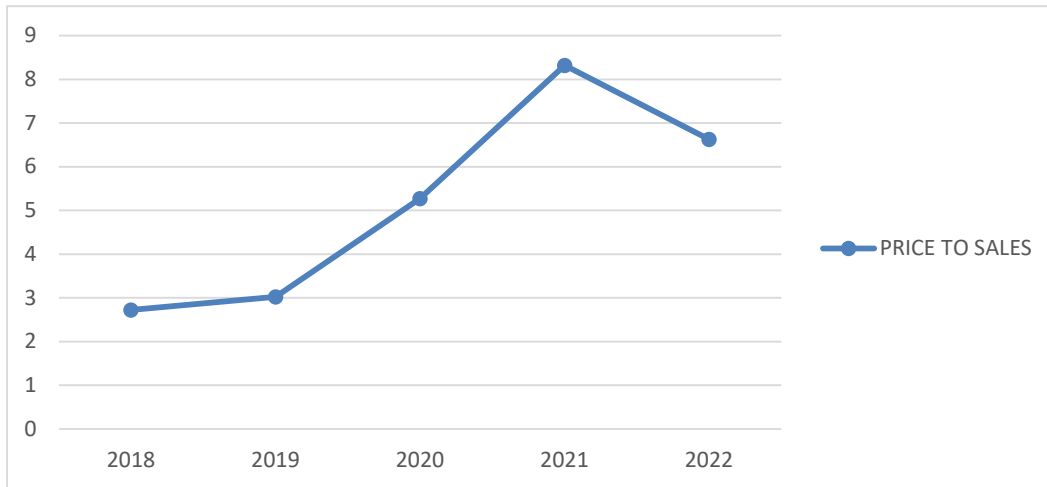
(4.2.8) DIVIDEND PAYOUT RATIO:

INTERPRETATION: In 2018 the payout ratio was good and in 2019 it had a high growth. But in 2020 the company was not able give any dividend.

(4.2.9) PRICE TO BOOK VALUE:

INTERPRETATION: In 2018 the book value ratio was low compared to next years. In 2019 and 2020 it attained a good growth rate and in 2018 it shot up to a high ratio and in 2022 it maintained a growing nature.

(4.2.10) PRICE TO SALES: Figure showing Price To Sales of Godrej Properties



INTERPRETATION: In 2018 the price to sales ratio was low compared to the next four years. In 2019 it shown an increase and in the later years 2020 & 2021 it attained a good growth rate. In 2022 it shown a decreasing trend.

(4.2.11) EARNINGS YIELD RATIO:

INTERPRETATION: In 2018 Godrej had the highest Earnings yield. And from the year 2019 onwards it showed a decreasing trend till 2022.

(4.2.12) DEBT TO EQUITY:

INTERPRETATION : In 2018 Debt to Equity was good and in 2019 it decreased slightly. In year 2020 it increased more than the previous years and from the year 2021 it started decline.

<b>INTRINSIC VALUE (4.2.13) Table showing Calculation of Percentage of growth</b>				
Percentage of growth = $P1-P0/P0*100$				
<b>PARTICULARS</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>INCOME</b>				
REVENUE FROM OPERATIONS [GROSS]	14.827	-18.10	-2.47	56.95
REVENUE FROM OPERATIONS [NET]	14.827	-18.10	-2.47	56.95
TOTAL OPERATING REVENUES	15.16	-14.11	2.50	52.86
Other Income	55.08	41.90	500.77	384.70
TOTAL REVENUE	16.89	-11.68	24.09	67.24
<b>EXPENSES</b>				
Operating And Direct Expenses	16.667	-27.28	-1.19	-61.98
Employee Benefit Expenses	26.77	161.66	290.13	387.71
Finance Costs	757	2094.92	3073.99	4847.78
Depreciation And Amortisation Expenses	41.75	44.8551	61.13	43.25
Other Expenses	223.37	144.684	347.96	325.98
TOTAL EXPENSES	27.49	-9.498	28.69	80.41
PROFIT/LOSS BEFORE EXCEPTIONAL, EXTRAORDINARY ITEMS AND TAX	-35.168	-22.44	1.48	2.54
PROFIT/LOSS BEFORE TAX	-35.168	-22.44	1.48	2.54
Current Tax	-34.189	10.1223	1.79	-131.6
Less: MAT Credit Entitlement	-100	-100	-100	-100
Deferred Tax	-203.58	1338.11	-117.93	-5778.92
TOTAL TAX EXPENSES	-24.87	-14.03	12.70	5.15
PROFIT/LOSS AFTER TAX AND BEFORE - EXTRAORDINARY ITEMS	-39.120	-25.66	-2.81	1.53
PROFIT/LOSS FROM CONTINUING OPERATIONS	-39.120	-25.66	-2.81	1.53

PROFIT/LOSS FOR THE PERIOD	-39.12	-25.6	-2.8	1.5
Minority Interest	-97.31	-100	-100	-100
CONSOLIDATED PROFIT/LOSS AFTER -MI AND ASSOCIATES	-16.9	8.32	23.07	32.60
Basic EPS (Rs.)	-20	0	10	10
Diluted EPS (Rs.)	-20	0	10	10
Equity Share Dividend	20.35	-100	-100	-100
Tax On Dividend	-100	-100	-100	-100

**(4.2.14) Table Showing Calculation of Average Growth**

Average growth = total/number of years

<b>PARTICULARS</b>	<b>AVERAGE</b>
<b>INCOME</b>	
REVENUE FROM OPERATIONS [GROSS]	12.80007803
REVENUE FROM OPERATIONS [NET]	12.80007803
TOTAL OPERATING REVENUES	14.10376053
Other Income	245.6181862
TOTAL REVENUE	24.13433789
<b>EXPENSES</b>	
Operating And Direct Expenses	-18.4472992
Employee Benefit Expenses	216.572717
Finance Costs	2693.604651
Depreciation And Amortisation Expenses	47.75224775
Other Expenses	260.5026579
TOTAL EXPENSES	31.77765699
PROFIT/LOSS BEFORE EXCEPTIONAL, EXTRAORDINARY ITEMS AND TAX	-13.39617143
PROFIT/LOSS BEFORE TAX	-13.39617143
Current Tax	-38.49067014
Less: MAT Credit Entitlement	-100
Deferred Tax	-1190.58296
TOTAL TAX EXPENSES	-5.263303463
PROFIT/LOSS AFTER TAX AND BEFORE EXTRAORDINARY ITEMS	-16.51668223
PROFIT/LOSS FROM CONTINUING OPERATIONS	-16.51668223
PROFIT/LOSS FOR THE PERIOD	-16.51668223
Minority Interest	-99.32840833
CONSOLIDATED PROFIT/LOSS AFTER MI AND ASSOCIATES	11.76339636
<b>OTHER ADDITIONAL INFORMATION</b>	
Basic EPS (Rs.)	0
Diluted EPS (Rs.)	0
Equity Share Dividend	-69.9122807
Tax On Dividend	-100

**(4.2.15) Table showing calculation of forecasted values for the year 2022**

Forecasted value = (100+average growth)/100+value for the year 2022

<b>PARTICULARS</b>	<b>CALCULATED VALUE</b>
INCOME	
REVENUE FROM OPERATIONS [GROSS]	35014.86946
REVENUE FROM OPERATIONS [NET]	35014.86946
TOTAL OPERATING REVENUES	39735.93492
Other Income	99372.20576
TOTAL REVENUE	77760.35399
EXPENSES	0
Operating And Direct Expenses	-10424.75325
Employee Benefit Expenses	37475.74295
Finance Costs	630384.2965
Depreciation And Amortisation Expenses	684.7672328
Other Expenses	70976.55417
TOTAL EXPENSES	91765.29342
PROFIT/LOSS BEFORE EXCEPTIONAL, EXTRAORDINARY ITEMS AND TAX	-4477.670299
PROFIT/LOSS BEFORE TAX	-4477.670299
Current Tax	1215.92027
Less: MAT Credit Entitlement	0
Deferred Tax	-150775.426
TOTAL TAX EXPENSES	-500.2769941
PROFIT/LOSS AFTER TAX AND BEFORE EXTRAORDINARY ITEMS	-3950.79039
PROFIT/LOSS FROM CONTINUING OPERATIONS	-3950.79039
PROFIT/LOSS FOR THE PERIOD	-3950.79039
Minority Interest	0
CONSOLIDATED PROFIT/LOSS AFTER MI AND ASSOCIATES	2977.90379
OTHER ADDITIONAL INFORMATION	0
Basic EPS (Rs.)	0
Diluted EPS (Rs.)	0
Equity Share Dividend	0
Tax On Dividend	0

**(4.2.16) Forecasted profit and loss account of Godrej Properties Ltd for the year ended 31-3-2022**

<b>PARTICULARS</b>	<b>ESTIMATED VALUE 2022</b>
INCOME	
REVENUE FROM OPERATIONS [GROSS]	37750.38946
REVENUE FROM OPERATIONS [NET]	37750.38946
TOTAL OPERATING REVENUES	42553.33492
Other Income	99776.78576
TOTAL REVENUE	80982.33399
EXPENSES	0
Operating And Direct Expenses	-9859.643249
Employee Benefit Expenses	37648.78295
Finance Costs	630618.3265
Depreciation And Amortisation Expenses	699.1072328
Other Expenses	71249.01417
TOTAL EXPENSES	94653.02342
PROFIT/LOSS BEFORE EXCEPTIONAL, SS EXTRAORDINARY ITEMS AND TAX	-4143.420299
PROFIT/LOSS BEFORE TAX	-4143.420299
Current Tax	1184.33027
Less: MAT Credit Entitlement	0
Deferred Tax	-150648.786
TOTAL TAX EXPENSES	-405.2269941
PROFIT/LOSS AFTER AND BEFORE S TAX EXTRAORDINARY ITEMS	-3711.59039
PROFIT/LOSS FROM CONTINUING OPERATIONS	-3711.59039
PROFIT/LOSS FOR THE PERIOD	-3711.59039
Minority Interest	0
CONSOLIDATED ASSOCIATES PROFIT/LOSS AFTER MI AND	3231.05379
OTHER ADDITIONAL INFORMATION	0
Basic EPS (Rs.)	11
Diluted EPS (Rs.)	11
Equity Share Dividend	0
Tax On Dividend	0



## Calculation of Intrinsic Value

COMPANY NAME	P/E RATIO	EPS 2022	P/E RATIO*EP S	*20%	INTRENSIC VALUE	MP
GODERJ	61.67	11	678.37	135.6	542.6	1385

INTERPRETATION: The current market value of Godrej Properties is higher than the intrinsic value. So it is desirable to sell the shares of Godrej from the view point of a potential investor. From the view point of existing share-holder it is not desirable to buy the shares of the company.

## FINDINGS FOR THE STUDY

The current market value of DLF is less than the intrinsic value. So it is desirable to buy the shares of DLF Ltd from the view point of a potential investor. From the view point of a existing shareholder it is better to hold the shares. The current market value of Godrej Properties is higher than the intrinsic value. So it is desirable to sell the shares of Godrej from the view point of a potential investor From the view point of existing shareholder it is not desirable to buy the shares of the company. While comparing the two companies it is desirable to invest in the shares of DLF because the market value is less than the intrinsic value. So that here is a future anticipation of growth. In the case of earnings per share ratio compared to Godrej the DLF Company have the highest. In case of PBDIT, PBIT& PBT margin Godrej have the highest compared to DLF. The Godrej have the highest ROA compared to DLF. Which means that it have the highest sales. The Godrej have the highest Quick Ratio compared to DLF. The Mahlife Company has the highest Dividend Pay-out Ratio compared to other companies. Compared to DLF Godrej has the highest P/B ratio & P/S ratio, which means that the market is willing to pay for each share. Here DLF have highest Earnings Yield of 0.12.A high ratio indicates a undervalued stock and vice versa. DLF has higher current ratio than Godrej Properties Ltd which shows its sound current assets with regards to current liabilities. The ideal Current Ratio is 2:1.

## **SUGGESTIONS FOR FURTHER STUDY**

It is recommended to buy and hold the shares which are undervalued of DLF. So, its share prices have the propensity to rise in the future. It is suggested to sell the overvalued shares such as Godrej Properties as their share prices have a tendency to decrease in the future. Every investor is recommended to make a thorough analysis of the capital market, about the company and industry before making any investment decisions. Risk taking, expressing differences and constantly generating new knowledge should be encouraged among the employees. Godrej Company has an understanding of its competitive position but the measurement, assessment and impact of the threat is not well defined. Investing in one share alone is not suggested as returns may not be favorable always. Investing in multiple or diversified shares reduces the risk and provides a stable return.

## **CONCLUSION**

Realty sector of India has been significantly contributed to the growth of Indian economy in terms of GDP, generation of employment and foreign exchange earnings. In Indian context, Realty sector industries are major contributors of GDP of India. From the study, it is undervalued as its intrinsic value is higher than its market value and suggested to buy the share since the price of the same may increase in future. In contrast is overvalued as its market value is higher and preferred to sell the share price my fall. It is recommended to each investor to have Realty sector companies in their portfolio since they are faster growing industry according to Indian context of research. In near future it is expected that number of investors will be flooding into the capital market that increases the relevance of fundamental analysis of various sectors. It can be concluded that the Real Estate sector companies are one most promising platform of investment in capital market and in turns give considerable return for the risk taken by investors.

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## **A STUDY ON RATIO ANALYSIS OF SLEEPWELL COMPANY, IRINJALAKUDA**

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### **ABSTRACT:**

Every business organization needs finance for its smooth functioning. This study aims to analyze the liquidity, profitability, solvency position of the firm and its efficiency. The study covers a period of five years i.e. from 2017-2022. It is well known for its mattresses worldwide through different brands. The financial performance of the company as per ratio analysis shows that the company is financially sound and is able to meet its debt. The overall view of five years shows that the company was able to handle the risk and was able to cope with the pandemic during 2019-20.

### **INTRODUCTION**

Finance is the study and discipline of money, currency and capital assets. Financial statements give financial information in absolute terms. Analysis and interpretation of financial statements is the process of analysing the information contained in the financial statements to judge profitability and financial soundness of a firm. A number of tools are used to undertake financial analysis. One of the tools are the ratio analysis. Financial ratios offer entrepreneurs a way to evaluate their company's performance and compare it with other similar businesses in their industry. Ratios measure the relationship between two or more

components of financial statements. Ratio analysis refers to the analysis of various pieces of financial information in the financial statements of a business. It compares line-item data from a company's financial statements to reveal insights regarding profitability, liquidity, operational efficiency and solvency. It is a quantitative method which is a cornerstone of fundamental analysis. Ratio analysis may also be required by external parties that set benchmarks often tied to risk. A ratio is the relation between two amounts showing the number of times one value contains or is contained within the other. The various kinds of financial ratios available may be broadly grouped into the following: -

### 1. Liquidity Ratios

Liquidity ratios measure a company's ability to pay off its short-term debts as they become due, using the company's current or quick assets. Liquidity ratios include the current ratio, and quick ratio.

- **Current Ratio:** The current ratio is the ratio between the current assets and current liabilities of a company. A good current ratio is typically anywhere between 1.5 and 2, but it can sometimes depend on the industry your company falls within.
- **Quick Ratio:** The quick ratio is used to ascertain information pertaining to the capability of a company in paying off its current liabilities on an immediate basis. The ideal standard quick ratio is 1: 1.

### 2. Solvency Ratios

Solvency ratios can be defined as a type of ratio that is used to evaluate whether a company is solvent and well capable of paying off its debt obligations or not.

The types of solvency ratios are: –

- **Debt Equity Ratio:** The debt-equity ratio can be defined as a ratio between total debt and shareholder's fund. The debt-equity ratio is used to calculate the leverage of an organization. An ideal debt-equity ratio for an organization is 2:1.
- **Debt Assets Ratio:** The debt-to-total assets ratio is primarily used to measure a company's ability to raise cash from new debt. The higher a company's debt-to-total assets ratio, the more it is said to be leveraged. A debt-to-assets ratio below 1.0 would be seen as relatively safe, whereas ratios of 2.0 or higher would be considered risky.

- Interest Coverage Ratio: The interest coverage ratio is used to determine the solvency of an organization in the nearing time as well as how many times the profits earned by that very organization were capable of absorbing its interest-related expenses. Analysts prefer to see a coverage ratio of 3 or better.

### 3. Profitability Ratios

This type of ratio helps in measuring the ability of a company in earning sufficient profits.

The types of profitability ratios are: –

- Gross Profit Ratio: Gross profit ratios are calculated in order to represent the operating profits of an organization. A gross profit margin ratio of 50 to 70% would be considered healthy.
- Net Profit Ratio: Net profit ratios are calculated in order to determine the overall profitability of an organization after reducing both cash and non-cash expenditures. anything between 0.5% to 3.5% is considered a good net profit ratio.
- Operating Profit Ratio: Operating profit ratio is used to determine the soundness of an organization and its financial ability to repay all the short term and long-term debt obligations. An operating profit ratio of about 20% is considered good, and below 5% is considered low.
- Return On Equity: Return on equity (ROE) is a financial ratio that shows how well a company is managing the capital that shareholders have invested in it. To calculate ROE, one would divide net income by shareholder equity. A return on equity ratio of 15% to 20% is usually considered good. At 5%, the ratio would be considered low.
- Return on Capital Employed (ROCE): Return on capital employed is used to determine the profitability of an organization with respect to the capital that is invested in the business. The general rule about ROCE is the higher the ratio, the better. That's because it is a measure of profitability. A ROCE of at least 20% is usually a good sign that the company is in a good financial position.

## **STATEMENT OF THE PROBLEM**

The major objective of the study is to know about the liquidity and solvency position of Sheela Form, Ltd. For this, ratios analysis is taken for meeting the objectives. It also gives the answers to the companies' improvement and how much it can improve in future periods.

## **OBJECTIVES OF THE STUDY**

- To know the liquidity position of the firm.
- To know the solvency position of the firm.
- To get aware about the profitability of the firm.

## **SIGNIFICANCE OF THE STUDY**

Preparation of ratio analysis is an important tool for efficient and effective managerial decisions. It helps to do comparative study as well as analyse the debts level and financial position of the company. It establishes the numerical relationship between two figures of a ratio statement to ascertain strength and weakness of a firm.

## **RESEARCH METHODOLOGY**

It is a way to systematically solve the research problem. It includes various methods and techniques for conducting research.

## **NATURE OF DESIGN**

The study is conducted in analytical and descriptive in nature.

## **SAMPLE SIZE**

Sheela Foam Ltd., incorporated in the year 1971, is a Mid Cap company operating in Consumer Durables sector. Sheela Foam has 1,748 employees which is in the industry of: Manufacturing General, Manufacturing. The ratio analysis is taken over 5 years from 2017 to March 2022.

## **TOOLS OF DATA ANALYSIS**

The various tools used in study are:

Liquidity ratios:

- Current ratio
- Quick ratio

Solvency ratio:

- Debt equity ratio
- Debt-assets ratios
- Interest coverage ratios.

Profitability ratio:

- Gross profit ratio
- Net profit ratio
- Operating profit ratio
- Return on equity
- Return on capital employed

## **SCOPE OF THE STUDY**

The various advantages of ratio analysis are as follows:

a) Comparison

With the help of ratio analysis, ideal ratios can be composed. These can be used for comparison in respect of the firm's progress and performance, inter-firm comparison with industry average.

b) Financial Solvency

Ratios are useful tools. It indicates the trends in the financial solvency of the firm. Long term solvency refers to the financial liability of a firm. It can also evaluate the short-term liquidity position of the firm.

c) Communication

The financial strength and weaknesses of a firm are communicated in a more easy and understandable manner by the use of ratios. It helps in the communication and enhance the value of the financial statements.

d) Control

It helps in making effective control of the business. Actual results can be compared with the



established standard and to take corrective action at the right time.

## **EMPIRICAL REVIEW**

1. According to (Munawir, 2018), the company financial performance is one of the foundations regarding the assessment of the company financial condition. Financial performance is an analysis to find out the company progress which is carried out using financial performance rules properly and correctly (Fahmi, 2012 in Suryaningsum 2016). The results of the analysis of the company performance are used by the management as a basis for decision making and as a tool for evaluating management performance.
2. According to Suryaningsum et al. (2017) financial performance is a description of the company financial condition in a certain period regarding aspects of fund raising and distribution of funds, which are usually measured by indicators of capital adequacy, liquidity, and profitability. Assessment of a company financial performance is very important to assess the effectiveness and efficiency of the company. The company's financial performance can be said to be healthy or unhealthy, it can be seen from the financial developments and the results of the activities that have been achieved by the company.
3. According to Supriyanto et al. (2017) leverage refers to the use of fixed costs to increase (lever-up) a company profitability. Meanwhile, according to Subramanyam (2017) leverage refers to the amount of debt funding in the company capital structure. In carrying out operational activities, companies usually use debt and capital funding. However, creditors are not willing to provide unsecured debt provided by capital funding. Leverage shows the extent to which the company assets are financed by debt (Kashmir, 2015).

## **INDUSTRIAL PROFIE**

A leader in Polyurethane (PU) Foam, Sheela Group is a multi-billion-rupee entity. It has a nationwide presence in manufacturing PU Foam with a global marketing perspective and an impeccable track record, since 1971. Sheela Group is committed to a one-point programme that of bringing comfort, convenience and luxury to enhance the lifestyle of a modern man.

The winning brands of Sheela Group include

1. SLEEPWELL - The flagship brand for mattresses and comfort accessories
2. FEATHER FOAM - A Pure PU Foam
3. LAMIFLEX - A superior quality POLYETHER/POLYESTER foam for lamination

It enjoys a significant presence overseas with its products being exported to over 20 countries worldwide. Founded by Ms. Sheela Gautam and Mr. Rahul Gautam Sheela Foam Ltd. was originally incorporated as a private limited company on June 18 1971 at Delhi with the name `Sheela Foam Private Limited'. Sheela Foam commenced manufacture of PU Foam in 1972. The company became a deemed public limited company on July 1 1989 and was restored to its status of private limited company with effect from November 30 1990. The company was converted to a public limited company pursuant to a special resolution on April 30 2016 and the name of the company was changed to `Sheela Foam Limited' on June 6 2016. In order to reorganise its group structure to subsume similar and complementary business lines of its subsidiaries and associates within its business the company has on three instances effected mergers of certain of its subsidiaries and associates with itself through schemes of amalgamation. In Fiscal Year 2003 three of its erstwhile wholly owned subsidiaries namely Feather Foam Enterprises Private Limited Soft Foam Industries Private Limited and Pallavi Foam Industries Private Limited which were involved in similar lines of business of the company merged with itself. Subsequently in fiscal year 2011 Serta India Private Limited a subsidiary company was merged with the company. Furthermore, in Fiscal Year 2013 five of its subsidiaries namely SNB Bedding International Private Limited Starlite India Private Limited RG Pillow (India) Private Limited Kanpav Overseas Private Limited and Auora Foams Private Limited merged with the company. Sheela Foam's promoter Polyflex Marketing Pvt Ltd. offloaded shares worth Rs 510 crore by way of an initial public offer (IPO) during the period from 29 November 2016 to 1 December 2016. The IPO was priced at Rs 730 per share. The stock was listed on the bourses on 9 December 2016. The company introduced economy model mattress 'Starlite' and Mid-Level Mattress 'Feather Foam' in July 2017 and February 2018 respectively. Post successful test marketing of the model in North India these models are being launched pan India. On the furniture side of the business the company has tied up with carpenters & upholsters under 'Anmol Bandhan Scheme'. This will help in selling Sleepwell and Feather Foam Furniture Foam. In FY 2019

the Company expanded its footprint in Europe and acquired Interplasp S.L. a subsidiary of Sheela Group in Spain. As on 31 March 2020 the Company has Six subsidiaries and two steps down subsidiaries. As on 31 March 2021 the Company has five subsidiaries and two steps down subsidiaries. In FY21 it set up a new Subsidiary Company called as International Comfort Technologies Private Limited and commenced the construction for a new plant under it at Maneri Industrial Area near Jabalpur MP. As on 31 March 2022 the Company has six subsidiaries and five steps down subsidiaries.

### **Vision**

- As a leading organisation in quality comfort products.
- Practicing values of integrity, reliability, pro-activity & transparency.
- To do business with a smile for customer delight.
- A commitment to society.

### **Innovative Products**

As a leader in the PU Foam industry, Sheela Group has a wide range of innovative product range offering technologically advanced consumer products that stand for a perfect blend of comfort and support. Sheela Group also caters to various industrial applications e.g., Automotive Industries, Sound Industry, Garment & Shoe industry with innovative PU Foam like Fire Retardant Foam, Reticulated Foam, Sound Absorption Foam used in GEN Sets etc.

### **Current Status**

Its authorized share capital is INR 100.00 cr. and the total paid-up capital is INR 48.78 cr. Sheela Foam Limited's operating revenues range is Over INR 500 cr for the financial year ending on 31 March, 2021. It's EBITDA has increased by 3.78 % over the previous year. At the same time, it's book net worth has increased by 22.07 %.

### **Products & Services**

Technical products, such as automotive, reticulated, silenctech, sound absorption, specialty, UV, rebounded, high resilience, pure grade, flame retardant, polyether grade lamination, anti-static, thermo-formable, hard and soft, and polyurethane and polyester foam products, as well as visco-elastic temperature sensitive materials. It also offers mattresses, pillows,

comforters/duvets, mattress protectors, bolsters, back cushions, and sofa-cum beds, as well as furniture cushioning products.

### **About Sleepwell Brand**

Sheela Gautam (15 November 1931 – 8 June 2019) was an Indian billionaire politician and businesswoman. She was the founder and owner of Sheela Foam Limited, run by her son Rahul Gautam, which sells mattresses under the Sleepwell brand among others. Sleepwell Enterprises Private Limited is a Private incorporated on 07 October 1994. It is classified as non-govt company and is registered at Registrar of Companies, Delhi. Its authorized share capital is Rs. 1,000,000 and its paid-up capital is Rs. 105,000. Sleepwell Enterprises Private Limited's Annual General Meeting (AGM) was last held on 30 September 2021 and as per records from Ministry of Corporate Affairs (MCA), its balance sheet was last filed on 31 March 2021. Directors of Sleepwell Enterprises Private Limited are Tushaar Gautam, Rahul Gautam, Sleepwell Enterprises Private Limited's Corporate Identification Number is (CIN) U74899DL1994PTC062005 and its registration number is 62005. Its Email address is iquebal.ahmad@sheelafoam.com and its registered address is 604 Ashadeep, 9 Hailey Road, New Delhi New Delhi DL 110001 IN .Current status of Sleepwell Enterprises Private Limited is - Active. The Sleepwell GenX (P) Mattress has PU Foam. Sleepwell is a market leader offering a pan-India distribution and manufacturing network, a diverse product portfolio, and robust R&D capabilities.

### **DATA ANALYSIS AND INTERPRETATION**

Analysis and Interpretation refers to a systematic and critical examination of the financial statements.. Ratio analysis is an important technique of analysis of financial statements. It was the first financial tool developed for analysis and interpretation. Solvency, Liquidity and Profitability ratios are used.

## LIQUIDITY RATIOS: CURRENT RATIO

$$\text{Current Ratio} = \text{Current Assets} / \text{Current Liabilities}$$

Table showing current ratio

Years	Current asset	Current liability	Current ratio
2017-18	428.54	266.29	1.6:1
2018-19	321.80	265.63	1.2:1
2019-20	370.84	248.72	1.5:1
2020-21	465.27	342.30	1.4:1
2021-22	423.91	325.40	1.3:1

(Source: annual report)

**Interpretation:** The standard current ratio is 2:1 which is almost met during 2017-18 and shows its ability to repay its short-term debt. During 2018-19 it has reduced while there was an increase to 1.5 during 2019-20. But it has reduced between the years 2020-22 due to the pandemic and difficulty of the company to meet its debt.

## QUICK RATIO

$$\text{Quick Ratio} = (\text{Cash and Cash Equivalents} + \text{Marketable Securities} + \text{Accounts Receivables}) / \text{Current Liabilities}$$

Table showing quick ratio

Years	Quick asset	Current liability	Quick ratio
2017-18	298.69	266.29	1.1
2018-19	168.84	265.63	0.6
2019-20	205.66	248.72	0.2
2020-21	236.95	342.30	0.7
2021-22	220.44	325.40	0.7

(Source: annual report)

**Interpretation:** The quick ratio is perfect from 2017 to 18 while there is a decrease in it from 2018 to 2022. 2019-20 was the year which experienced more decline as the company was facing difficulties with the pandemic.

## SOLVENCY RATIO: DEBT-EQUITY RATIO

- Debt Equity Ratio = Total Debts / Shareholders Fund

Table showing debt-equity ratio

Years	Debt	Equity	Debt-equity ratio
2017-18	1.20	546.33	0.01
2018-19	0.31	669.07	0.00
2019-20	2.84	830.12	0.00
2020-21	1.99	1013.37	0.00
2021-22	19.40	1209.52	0.01

(Source: annual report)

### Interpretation

It defines the relationship between total debt and shareholder's fund. The ideal ratio is not met in any of the years. The debt was high only during 2017-18 and 2021-22

## DEBT-ASSETS RATIO

- Debt-to-Assets Ratio = Total Debt / Total Assets

Table 4.1.4 showing debt-assets ratio

Years	Debt	Assets	Debt-asset ratio
2017-18	1.20	616.61	0.002
2018-19	0.31	745.80	0.000
2019-20	2.84	914.02	0.003
2020-21	1.99	1070.42	0.002
2021-22	19.40	1293.57	0.015

(Source: annual report)

### Interpretation

The higher the ratio, higher the firm is leveraged. Here, the company enjoys high debt to asset ratio

during 2021-22 compared to previous years. This tells us that it can use its assets to pay its debts.

### **INTEREST COVERAGE RATIO**

$$\text{Interest Coverage Ratio} = \text{Earnings Before Interest and Taxes} / \text{Interest Expense}$$

The interest coverage ratio is more than the standard in all years. But there is increase by 38.21% at the time from 2021-22 in which the company had improved once after the pandemic.

### **PROFITABILITY RATIOS:**

#### **GROSS PROFIT RATIO**

- Gross Profit Ratio = (Gross Profit / Net Sales)

The gross profit of the company is less during 2017-20 compared to the current years. 2020-21 we can see a jump in the profit by 16.2 while it came down to 14% in the next period.

Table showing gross profit ratio

Years	Gross profit	Net sales	Gross profit ratio
2017-18	210.28	1656.53	12.7%
2018-19	206.69	1813.76	11.3%
2019-20	248.24	1754.77	14.1%
2020-21	275.98	1693.86	16.2%
2021-22	296.95	2124.44	14%

## NET PROFIT RATIO

- $\text{Net Profit Ratio} = (\text{Net Profit} / \text{Net Sales}) * 100$

Table showing net profit ratio

Years	Net profit	Net sales	Net profit ratio
2017-18	125.64	1656.53	7.58%
2018-19	120.96	1813.76	6.67%
2019-20	161.25	1754.77	9.19%
2020-21	168.72	1693.86	9.96%
2021-22	187.57	2124.44	8.83%

(Source: annual reports)

### Interpretation

Similar to gross profit, the net profit of the firm found to be increased during 2020-21 by 10% and a sudden decline in 2021-22 by 9%.

## OPERATING PROFIT RATIO

- $\text{Operating Profit Ratio} = (\text{operating profit} / \text{Net Sales}) * 100$

Table showing operating profit ratio

Years	Operating profit	Net sales	Operating profit ratio
2017-18	216.04	1656.53	13.04%
2018-19	214.03	1813.76	11.80%
2019-20	256.38	1754.77	14.61%
2020-21	284.66	1693.86	16.80%
2021-22	304.06	2124.44	14.31%

(Source: annual reports)

### Interpretation

Operating profit above 20 is good which means during 2020-21 it has met with the standard ratio that tells us the ability of the firm to repay all the short term and long-term debt obligations.



## RETURN ON EQUITY

- Return on Equity= Net Income/ Shareholders' Equity

Table showing return on equity

Years	Net income	Shareholders' equity	Return on equity
2017-18	1696.57	546.33	3.10
2018-19	1851.67	669.07	2.77
2019-20	1792.26	830.12	2.16
2020-21	1749.79	1013.37	1.73
2021-22	2203.32	1209.52	1.82

### Interpretation

The return on equity ratio actually shows poor performance as it is below 5% during the 5 years. The standard ratio is 15% or more.

## RETURN ON CAPITAL EMPLOYED

- ROCE = Earnings Before Interest and Taxes / Capital Employed

Table showing return on capital employed

Years	EBIT	Capital employed	Return on capital employed
2017-18	182.50	362.03	50.4%
2018-19	175.60	485.03	36.2%
2019-20	215.15	670.77	32%
2020-21	243.45	732.48	33%
2021-22	264.56	970.65	27.3%

(Source: annual reports)

### Interpretation

Higher the ratio, it is good for the firm as it defines its profitability. If its above 20%, the company is stable and has good profit. During 2017-18 we can its more than the standard ratio by 50% while it has declined later. The current year 2021-22 ratio is above 20 but below 50 which was met during 2017-18.

## **FINDINGS**

Liquidity ratio of the firm is ideal because the standard ratios is almost met in current ratio and quick ratio. This shows that the company was able to meet its debt and is financially sound. Solvency ratios include debt equity, debt asset and interest coverage ratio. Similar to liquidity ratios, it has met standards and the company shows its ability to meet its debt. Interest coverage ratio shows that the firm is capable of absorbing its interest rate expenses because it has met the standards in all years. Under profitability ratio, the company experienced an increase in profit by 16.2% during 2020-21 when the pandemic issues came down. However, it has declined to 14% during 2021-22. Gross profit ratio of the firm shows that the firm was on profit throughout the year. There was a slight decline during 2021-22. The operating profit ratio shows the same increase during 2020-21 and it has also met with the standard 20%. This shows that the company had the ability to meet its short -and long term obligations. The net profit of the firm found to be increased during 2020-21 by 10% and a sudden decline in 2021-22 by 9%. This shows that the firm found increase before the pandemic and has reduced due to difficulties faced. The return on equity ratio shows the opposite reaction from all other ratios because it has not met with the standard ratio 15%. This shows the company is not well managing its capital. Return on capital employed ratio is one of the important ratios as higher the ratio, higher will be the profitability of the firm. The company has met above the standard 20% in all years showing that it was on profit for the five years.

## **SUGGESTIONS FOR FURTHER STUDY**

Current assets must be increased to maintain the ideal ratio as in the company meet its debt. More of liquid assets must be maintained as it will improve the liquidity position to payoff current liabilities as soon as possible. The debt of the company should be maintained in all years or else it can face loss. The gross profit of the company should be kept in the same level as 2020-21 without any decline in the current year. Expenses should be reduced and maintained. Return on equity shows poor performance. It is necessary that the company should be able to manage its capital invested.

## CONCLUSION

The study done on financial analysis of Sheela Foam Ltd has helped to understand the financial strengths and weakness of the company. The company is facing cut throat competitions in the Indian market as well as international market. Despite these challenges Sheela foam has done well. This is because they are always looking out for new opportunities. The Company is the pioneer in the mattress and foam industry with a wide range of offerings in home comfort technical foam and institutional foam range. It enjoys a significant presence overseas with its products being exported to over 20 countries worldwide. The financial performance of the company as per ratio analysis shows that the company is financially sound and is able to meet its debt. The overall view of five years shows that the company was able to handle the risk and was able to cope with the pandemic during 2019-20. Even though a decrease in the profitability and liquidity was found during those years, the company came up from that the next year.

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## **A STUDY REGARDING THE DIFFERENT MODES OF ADVERTISEMENTS IN THE MOBILE PHONE MARKET**

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### **ABSTRACT**

The study aims to determine the most influenced advertisement mode on a gender basis while purchasing mobile phones. This study has used an offline questionnaire survey to measure people's attitudes towards mobile phone advertisements. The main aim of an ad is to create an impact on buyer behaviour. This study mainly focuses on advertisements in the mobile phone market; whether mobile phone advertisements generate any effect on the purchase decision, this study also compares print media and electronic media based on gender. This study is relevant since there is a wide range of mobile phone choices in the market, creating confusion among the buyers in making their choice. So here comes the importance of advertisements in the mobile phone market. It helps the buying process simpler by providing proper and adequate information to the customer.

**KEYWORDS: Advertisement, Mobile phone market, Mediums**

### **INTRODUCTION**

In today's world, people are always aware of the products in the market before they buy, and it is unimaginable to expect someone to spend money on a product they did not hear about. An advertisement is a powerful tool for increasing sales and has done wonders in distribution. It helps to build brand awareness among people and thus introduces information about the

company. Attractive advertisement increases the public's demand, eventually boosting the sale of a particular brand. Advertising helps the company, the customer, and the government. Ads are the quickest means of communication between the government and ordinary people. There are different modes of advertisements, such as indoor, outdoor, and electronic mediums. This study mainly focuses on the influence of these modes of advertising among mobile phone buyers. Mobile phones have become one's first choice irrespective of age, and it has become a status symbol in present-day life. There is a wide range of brands in the market that supply various mobile phones to customers. It creates confusion among people when buying a phone. The wide range of choices in the mobile phone market has increased the importance of advertisements in this industry. Advertisements make purchasing a mobile phone much more straightforward for customers by providing accurate and adequate information and up-to-date news. People buy a mobile phone based on certain factors like features, style, colour, applications, battery, price etc. Advertising helps people know about all these factors before purchasing a phone and enables them to buy the market's best product. Advertisement has proven to be a powerful force in introducing a product, service, or idea that a firm sells to society and convinces them about it.

## **STATEMENT OF THE PROBLEM**

An advertisement has the power to persuade a customer to buy, and it can change the market and improve profitability. Every industry relies on advertising to enhance its sale and for better growth. Nowadays, we can see various advertisement mediums and choosing the most suitable promotional tool for a particular product is a company's task. In this study, the researcher mainly focuses on the most effective mode of advertisement in the mobile phone market based on gender and compares print and electronic mediums based on gender.

## **SCOPE OF THE STUDY**

Advertisement helps a company earn profit by enabling more people to know about the product and company, thereby increasing sales. It allows customers to make decisions by providing valuable information about the product and services. With the help of an ad, a customer knows about the best possible option available to them. In this study, the researcher has taken samples from Meenachil Taluk, Kottayam district, Kerala.

## **OBJECTIVES OF THE STUDY**

Following are the objectives of the study:

1. To find out the most effective mode of an advertisement based on gender while purchasing mobile phones.
2. To make a comparison between gender and their interest in reading the same ad in print media and electronic media.
3. To find out whether an advertisement helps identify a mobile phone's features.
4. To identify whether people watch an ad repeatedly before they make purchases.

## **HYPOTHESIS**

The following hypothesis is formulated based on the above objectives:

1. There is no association between gender and their interest in watching the same advertisements in electronic media.
2. There is no association between gender and their interests in reading the same advertisements in print media.
3. There is no association between gender regarding factors that influence a purchase decision for a mobile phone brand.

## **LIMITATIONS OF THE STUDY**

1. The authenticity of data depends upon the respondents' viewpoint and the sincerity they have shown in answering the questions.
2. This study is limited to Meenachil Taluk, Kottayam district.

## **LITERATURE REVIEW**

The beneficial publicity creates impressions in clients to purchase mobile phone commodities. Aspects of personal and environmental commitment have a crucial influence on the attitude of Pakistani buyers. (Muhammad Arshad, Ahmad and Javed, 2014)

Material properties of mobile phones are an extensively significant element of the survey executed in Khulna city. Additional components that impact the buyers to shop mobile phones are pricing, charging and utilizing capabilities, quantity and strength and suggestions

and advertisements. ( Md Reaz Uddin, Nusrat Zahan Lopa, Md. Oheduzzaman, 2014)

The motivation to acquire a specific mobile phone brand is brand commitment, trait, social significance, value, and characteristics. Among these brand commitments, characteristics, and social prestige are the supreme certainties that the clients continue to acquire the brand. (Mohd Yusuf and Shafri, 2013)

The advanced technology components such as the internet browsing and vitality or excellence of the mobile phone handsets are the supreme components influencing mobile phone purchase. Knowledgeable youngsters are the extensively targeted community which the manufacturers have to analyze vastly. Raymond K. Dziwornu (2013)

The peers in Indore are purchasing smartphones disregarding the rates. As a name, social portrayal, engineering, and vitality play a prominent part in buying judgements. (Surendra, Dr. Manminder Singh and Avijeet 2013)

Correlation and multiple regression analysis performed in Hawassa town illustrate that mobile phone characteristics are a critical variable among all other aspects that impacted the peers to purchase mobile phones. (Mesay Sata 2013)

## **RESEARCH METHODOLOGY**

**Tools Used:** The primary data was collected from the respondents using a questionnaire. The gathered data have been classified and tabulated for analysis. The researcher has used frequency tables, bar diagrams, pie charts, and chi-square analysis to study and interpret the collected data.

**Sampling techniques:** In this study, the convenience sampling technique was used to collect reliable data from the respondents.

**Sampling size:** The sample size taken for collecting the data is 100.

**Sampling area:** The area chosen for collecting primary data is the Meenachil Taluk, Kottayam District, Kerala.

## DATA ANALYSIS AND INTERPRETATION

This part aims to analyze various aspects of different modes of advertisement. The data collected are classified and tabulated. The tables are scientifically explained. The interpretations of the data are given with skill and clarity. Appropriate diagrams supplement the tables.

**Table 1: The most influential mode of advertisement while purchasing a mobile phone**

MODES	MALE (%)	FEMALE (%)	TOTAL
Indoor	25 (50)	25 (50)	50
Outdoor	2 (4)	2 (4)	4
Electronic	23 (46)	23 (46)	46
Total	50	50	100
<i>Source: Primary Data</i>			

The above table depicts that most respondents prefer the indoor medium of advertisements followed by electronic and outdoor mediums, respectively. While considering on a gender basis, both men and women equally prefer indoor mediums as the most influential and outdoor mediums as the least effective advertisement mode while purchasing a mobile phone.

**Table 2: Identifying the features of mobile phones through advertisement**

Response	Male (%)	Female (%)	Total
Yes	37 (74)	37 (74)	74
No	13 (26)	13 (26)	26
Total	50	50	100
<i>Source: Primary Data</i>			



The above table shows that most respondents agree that advertisements help them identify a phone's features while the rest, 13%, do not agree. Both men and women equally agree and disagree with the statement.

**Table 3: Frequency of watching the ads for mobile phones before the purchase**

<b>Times</b>	<b>Male (%)</b>	<b>Female (%)</b>	<b>Total</b>
1-2 Times	16 (32)	25 (50)	41
3-5 Times	24 (48)	19 (38)	43
More Than 5	10 (20)	6 (12)	16
<b>Total</b>	<b>50</b>	<b>50</b>	<b>100</b>
<i>Source: Primary Data</i>			

This table reveals that 43% of the respondents prefer to watch an advertisement 3-5 times before making a purchase, followed by 1-2 times (41%) and more than five times (16%). Based on gender, men prefer to watch an ad more times than women.

**Table 4: Attention toward taglines of mobile brands**

<b>Response</b>	<b>Male (%)</b>	<b>Female (%)</b>	<b>Total</b>
Yes	33 (66)	35 (70)	68
No	17 (34)	15 (30)	32
<b>Total</b>	<b>50</b>	<b>50</b>	<b>100</b>
<i>Source: Primary Data</i>			

The above table finds that 68% of people notice taglines, whereas 32% do not. Based on gender, it is observed that women are more likely to see taglines which are 2.94%, than men. And it also depicts that only 34% of men and 30% of women pay less attention to mobile phones' taglines.

**Table: 5 Chi-square test between gender and the interest in watching the same ads in electronic media by respondents**

O	E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
28	27.5	.25	.0090
27	27.5	.25	.0090
22	22.5	.25	.0111
23	22.5	.25	.0111
TOTAL			.0402

*Source: Primary data*

H<sub>01</sub>—There is no association between gender and interest in watching the same advertisements in electronic media

H<sub>11</sub>— There is an association between gender and interest in watching the same advertisements in electronic media

$$\chi^2 = \sum (O-E)^2/E = .0402, \nu = (r-1)(c-1) = 1, \text{ When } \nu=1, \chi_{0.05} = 3.84$$

Since the table value is greater than the calculated value, the Null Hypothesis (H<sub>01</sub>) is accepted. So, there is no association between gender and interest in watching the same advertisements in electronic media. Hence both men and women exhibit a similar kind of interest in watching the same advertisements repeatedly.

**Table 6: Chi-square between gender and the interest in reading the same ads in print media by respondents**

O	E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
30	23.5	42.25	1.798
17	23.5	42.25	1.798
20	26.5	42.25	1.594
33	26.5	42.25	1.594
TOTAL			6.784

*Source: Primary data*

H<sub>02</sub>— There is no association between gender and interest in reading the same advertisements in print media

H<sub>12</sub>— There is an association between gender and interest in reading the same advertisements in print media

$$\chi^2 = \sum (O-E)^2/E = 6.784, \nu = (r-1)(c-1) = 1, \text{ When } \nu=1, \chi_{0.05} = 3.84$$

Since the table value is less than the calculated value, the Null hypothesis (H<sub>02</sub>) is rejected. There is an association between gender and interest in reading the same advertisements in print media. Men's and women's interests differ in reading the same advertisements in print media like newspapers, magazines, leaflets, pamphlets, etc.

**Table 7: Chi-square test between gender and the factors that influence the purchase decision of mobile phone**

O	E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
5	5	0	0
5	5	0	0
6	6.5	.25	.038
7	6.5	.25	.038
6	8	4	.5
10	8	4	.5
20	18	4	.22
16	18	4	.22
7	7	0	0
7	7	0	0
6	5.5	.25	.045
5	5.5	.25	.045
TOTAL			1.606

*Source: Primary data*

H<sub>03</sub>—There is no association between gender regarding factors influencing a mobile phone brand's purchase decision.

H<sub>13</sub>— There is an association between gender regarding factors influencing a mobile phone brand's purchase decision.

$$\chi^2 = \sum (O-E)^2 / E = 1.606, v = (r-1)(c-1) = 5, \text{ When } v=5, \chi_{0.05} = 11.07$$

Since the calculated value is less than the table value, the Null hypothesis (H<sub>03</sub>) is accepted. So, there is no association on gender while considering factors such as advertisements, popularity, price, feedback from others, after-sale service, features and specifications that influence them to purchase a particular mobile phone brand.

## FINDINGS

1. The majority of the respondents prefer the indoor medium as the most influential mode. Based on gender, both men and women like the indoor medium as the most effective and the outdoor medium as the least significant advertisement mode while purchasing a mobile phone.
2. Television is considered the most influential medium in indoor advertisement by men and women when purchasing mobile phones.
3. Among outdoor advertisements, flex boards, vehicle advertisements, and event sponsoring are equally influential.
4. Website is the most influential medium in electronic advertisements, while purchasing mobile phones and radio is considered the least influential by both men and women.
5. Most people are interested in watching an advertisement more than once on electronic media.
6. The quality of the advertisement is the main factor for both men and women to watch a mobile phone advertisement on electronic media more than once.
7. The majority of the samples are not interested in reading an advertisement more than once in print media.
8. While comparing the electronic and print ads, people are more interested in repeatedly watching the same electronic advertising than reading a printed advertisement.
9. Feedback from others about the product is the main influential factor in buying a particular mobile phone brand.
10. Most people suggest user-friendly features as the most crucial factor while purchasing a mobile phone.
11. Women prefer to buy a phone by looking at its style, colour, application and features, whereas men consider factors like software, price, word of mouth and brand value.
12. The majority of both men and women agree that advertisements help them identify mobile phones' features.
13. The frequency of watching an advertisement by 44% of respondents is 3-5 times, and 43% of respondents, it is 1-2 times before the purchase of a mobile phone. While comparing based on gender, men are likely to watch an ad more frequently than women.
14. About 68% of respondents notice taglines on their mobile phones. Based on gender, women are more likely to consider taglines by 2.94% compared to men.

15. There is no association between gender and their interest in watching the same advertisements in electronic media.
16. There is an association between gender and their interests in reading the same advertisements in print media.
17. There is no association between gender regarding factors that influence a purchase decision for a mobile phone brand.

## **RECOMMENDATIONS**

Following are the recommendations made from the study to mobile phone companies to improve their advertisement strategies:

1. Mobile phone companies should create more ads through indoor media, mainly television, as people prefer them. Still, at the same time, the company should try to improve the quality and attractiveness to increase the viewership of outdoor advertisements.
2. Mobile phone companies should focus more on electronic advertisements as people repeatedly view electronic media than print media since they find the former to be of more quality.
3. Mobile phone companies should focus on giving more information about using a particular phone in their advertisements. It will make phones more user-friendly, which will influence people to buy them.

## **CONCLUSION**

This study revealed that advertisement plays a vital role in the growth of mobile phone markets. It influences people's decision-making by educating them with the required information and choosing the best product in the market by differentiating it from its competitors. Indoor medium is the most preferred advertisement mode among men and women. They also like to watch an ad repeatedly in electronic media compared to reading it more than once in print media. Quality of advertisement helps to create a group of loyal customers for their brand. Hence, selecting the most appropriate advertising medium for its product is crucial for a mobile phone company.

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## **ASTUDY ON INVESTMENT BEHAVIOUR AND PATTERN OF WORKING WOMEN**

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### **ABSTRACT**

Savings encourage investment, and investment boosts the economy of the nation. In India, the household sector takes the top spot when it comes to savings. Women's income in the past was merely an additional source of income. But in today's society, the family heavily depends on the income of women. To handle the unforeseen emergencies in the family, women must invest. Women and men invest differently than males, according to a number of research. Women have lower risk tolerance and have lower investment returns. This study was done to examine how working women invest their money. The study looks at current investment patterns and awareness levels for various investment options, including bank deposits, insurance, postal savings, bonds, debentures, and shares.

**KEY WORDS : Savings, investment behaviour, investors, working women**

### **INTRODUCTION**

Investment is an essential part of wealth creation in India. Investment is the sacrifice of an asset to attain an increase in value over a period of time. It is the sacrifice of certain present consumption for some future benefit. The consumption in the current period is foregone in order to obtain a greater return in the future. In finance, the purpose of investing is to



generate a return from the invested asset. The return may consist of a gain or a loss realized from the sale of a property or an investment, unrealized capital appreciation or investment income such as dividends, interest, or rental income, or a combination of capital gain and income. Although investing is motivated by the prospect of future growth or income, there is always an element of risk connected with it.

Risk can be defined as the probability that the actual returns of a security differ from the expected return. There is a positive relationship between the amount of risk assumed in the administration of a portfolio of securities and the amount of expected return. In very general terms, the higher the risk, the higher the expected return and vice versa. The investor who is willing to take more risks will be compensated with higher returns. An investor with moderate risk would get moderate returns and the investor who is risk averse and takes very little risk will only get lower returns. Therefore, the degree of risk taking will determine the level of profitability. Investors, particularly novices, are often advised to diversify their portfolio. Diversification has the statistical effect of reducing overall risk. It aims to maximize returns by investing in different areas that would each react differently to the same event. The main characteristics observed in an investment are the security of the amount of capital, liquidity, income and its stability, appreciation and finally easy transferability. A diverse variety of investment paths are available in abundance and types such as stocks, banks, corporations, gold and silver, real estate, life insurance, postal savings. All investors invest and wish to invest their surplus money based on their aptitude for risk and capacity.

## **OBJECTIVES OF THE STUDY**

To study the investment pattern of working women in the study area. 2. To identify the current awareness level of women towards financial avenues of investment. 3. To analyse the preference of women towards various financial avenues. 4. To understand the factors influencing investment decision of investors.

## **STATISTICAL HYPOTHESIS OF THE STUDY-**

Testing the significance of relationship between annual income and various alternatives of investment. Equity  $H_0$ : There is no significant relationship between annual income and investment in equity  $H_1$ : There is a significant relationship between annual income and investment in equity. Mutual Fund  $H_0$ : There is no significant relationship between annual

income and investment in Mutual Funds.  $H_1$ : There is a significant relationship between annual income and investment in Mutual Funds Insurance Products.  $H_0$ : There is no significant relationship between annual income and investment in Insurance Products.  $H_1$ : There is a significant relationship between annual income and investment in Insurance Products. Debt Instruments  $H_0$ : There is no significant relationship between annual income and investment in Debt Instruments.  $H_1$  There is a significant relationship between annual income and investment in Debt Instruments. NSC, PPF and Government Bonds  $H_0$ : There is no significant relationship between annual income and investment in NSC, PPF and Government Bonds.  $H_1$ : There is a significant relationship between annual income and investment in NSC, PPF and Government Bonds.

## **RESEARCH METHODOLOGY**

The success of my research depends upon the suitable methods adopted to find out the result. This shows the design of the study and the approaches adopted for this study. Descriptive research is used in this study. This research is conducted through primary and secondary data collection methods. The population in the study is the working women in Thrissur district. The population of the study is infinite. To study the investment pattern and behavior of working women, convenience sampling method is adopted. Primary data is collected from 300 samples from Thrissur district. Primary data collection is done with the help of questionnaires. Secondary data: Secondary data collected from published books, websites, newspapers, journal and articles etc. The main instrument used for collecting the required data was a well structured questionnaire. A detailed questionnaire has been prepared to seek the opinion of the respondent. The respondents were asked to answer and the information elicited was noted. The collected data are interpreted and analyzed using various statistical tools like percentage analysis, weighted average mean and chi-square. Tables are used to represent the data.

## **REVIEW OF LITERATURE**

An empirical literature is a comprehensive summary of previous research on a topic. The literature review surveys scholarly articles, books and other sources relevant to a particular area of research. The review should enumerate, describe, summarize, objectively evaluate and clarify the previous research.

1. **Silvester Mercy and Gajendran Vijayakumar (2020)** in their study on **Investment Behavior of Working Women in Chennai City** they found that the working women are wellaware of the savings avenues, and both government and private sector working women are having a similar view on awareness altitude about the savings avenues in the study region. The working women are investing in availing the income tax benefit, fair return, accumulation of retirement corpus, children's education, marriage expenses, holidays, and Liquidity. Furthermore, the study points out that there is a considerable association among yearly income and investment among the working women in the study area.
2. **Dr.Chitra.D&Dr.Mahalakshmi.V(2020)** conducted **“A Study On Investor Behaviour Of Working Women Towards Retirement Planning”**. The study aims to focus on Investment behaviour of working women towards retirement planning. The study is based on female employees only who are working in government, private organisations and self-employed. It is concluded that most of the respondents are make Investment for Liquidity, since a greater number of respondents have moderate level of awareness about Investment so the agents and brokers should promote more knowledge about Investment.
3. **RajanBhaskaran, Kaur Navjot, Athwal.K.Harpreet, Rahman Afzalur and P.S. Velmurugan (2020)** in their **Empirical Assessment: Financial Literacy As A Tool For Stimulating The Investment Behaviour Of Rural Women**, the investment behaviour on effect of financial awareness of 335 rural women in Jalandhar district has been evaluated. The relationship of financial literacy and saving & investment behaviour is also evaluated in the context of five basic domains of financial behaviour, such as demographic variables, financial control, financial planning, financial product selection and financial literacy. Results of the study revealed that rural women are conscious about the availability of various investment avenues in the market, but their investment pattern is still followed by some factors like familiarity, safety and assured returns, etc. This study suggests policymakers to focus on financial awareness rather to focus only on financial literacy.
4. **S. Sabarinathan, Dr.R. Vanathi(2020)** **A Review Research On Investment Behaviour Of Different Class People In India**. This paper is to examine the investment behaviour of different class people in India through previous review of

literature researches. The major findings of this research paper are salaried class investors and general professional investors investing in long term benefits investment avenues which yield high return, in addition to the traditional investments like fixed deposits, gold and post office saving as like investments by other class of people. Financial professional are investing their part of income in share market and mutual funds. High spending habits and the average income level of those Middle-income group investors are investing mere in Post office saving scheme, saving account in bank and fixed deposits.

5. **Dr. G.Rekha&R.Vishnupriya(2019)** studied on **Investment Pattern Among Working Women**. The study is based on the analysis of investment pattern among working women which includes both government and private sector employees and also business person and it has been found that many of the respondents are working in private sector. They prefer mainly in investing in gold. It is evident from the study that most of the women are saving their money for their children's education, marriage and to fulfil other goals of their life. There is a chance to increase the savings and investment habits among salaried women and their investment depends upon the annual income among the respondents. The study resulted that higher income group are investing more in their investment.

## **DATA ANALYSIS AND INTERPRETATION**

**CHI-SQUARE TEST**In this study chi-square test is used to test the independence of two attributes i.e., whether there is a significant association between two variables.

### **Annual Income and Various Alternatives of Investment.**

Under this analysis the relationship between two attributes annual income and various alternatives of investments is tested using the Chi-square test. For the possible acceptance following null hypothesis and alternative hypothesis are laid down.

### **Annual income and investment in Equity.**

H<sub>0</sub>: There is no significant relationship between annual income and investment in equity.  
H<sub>1</sub>: There is a significant relationship between annual income and investment in equity.

**Table 4.1.1. Annual income and investment in equity**

O	E	O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
22	20.4	1.6	2,56	0.1255
7	6.6	0.4	0.16	0.024242
9	8.6	0.4	0.16	0.0186
38	42	-4	16	0.380952
15	15.4	-0.4	0.16	0.01039
9	7	2	4	0.571429
				1.31108

Degree of Freedom= (r-1)\*(c-1) = (4-1)\*(2-1) = 3 Table value= 7.815

Calculated value= 6.637807

Calculated value at 5% significance level and 3 degree of freedom is less than the table value. So, we accept the null hypothesis. There is no significant relationship between the annual income and investment in equity.

### **1.1.1. Annual income and investment in Mutual Fund.**

H<sub>0</sub>: There is no significant relationship between annual income and investment in Mutual Fund. H<sub>1</sub>: There is a significant relationship between annual income and investment in Mutual Fund.

**Table 4.1.2. Annual income and investment in mutual fund**

<b>O</b>	<b>E</b>	<b>O-E</b>	<b>(O-E)<sup>2</sup></b>	<b>(O-E)<sup>2</sup>/E</b>
8	7.76	0.24	0.0576	0.007423
58	58.2	-0.2	0.04	0.000687
22	21.34	0.66	0.4356	0.020412
12	12.7	-.7	0.49	0.038582
				0.067104

Degree of freedom= (r-1)\*(c-1) at 5% level of significance = (4-1)\*(2-1) = 3 Table Value = 7.815 Calculated value = 2.634593. Calculated value at 5% significance level and 3 degree of freedom is less than the table value. So, we accept the null hypothesis. There is no significance relationship between the annual income and investment in Mutual Fund.

**Annual income and investment in Insurance products**  $H_0$ : There is no significant relationship between annual income and investment in insurance products.  $H_1$ : There is a significant relationship between annual income and investment in insurance products.

**Table 4.1.3. Annual income and investment in Insurance products**

<b>O</b>	<b>E</b>	<b>O-E</b>	<b>(O-E)<sup>2</sup></b>	<b>(O-E)<sup>2</sup>/E</b>
7	7.6	-0.6	0.36	0.047368
59	57	2	4	0.070175
20	20.9	-0.9	0.81	0.038756
14	11.8	-2.2	4.84	0.410169
				0.566468

Degree of freedom=  $(r-1)*(c-1)$  at 5% level of significance =  $(4-1)*(2-1) = 3$  Table Value = 7.815 Calculated value = 3.952313 Calculated value at 5% significance level and 3 degree of freedom is less than the table value. So, we accept the null hypothesis. There is no significance relationship between the annual income and investment in Insurance products.

**Annual income and investment in Debt Instruments.**

$H_0$ : There is no significant relationship between annual income and investment in Debt instruments.  $H_1$ : There is a significant relationship between annual income and investment in Debt instruments.

**Table 4.1.4. Annual income and investment in Debt Instruments.**

O	E	O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
5	6	-1	1	0.166667
45	45	0	0	0
17	16.5	0.5	0.25	0.015152
11	9.5	1.5	2.25	0.236842
15	15	0	0	0
7	7.5	-0.5	0.25	0.033333
				0.451994

Degree of freedom=  $(r-1)*(c-1)$  at 5% level of significance =  $(4-1)*(2-1) = 3$  Table Value = 7.815 Calculated value = 0.860606 .Calculated value at 5% significance level and 3 degree of freedom is less than the table value. So, we accept the null hypothesis. There is no significance relationship between the annual income and investment in Debt Instruments.

**Annual income and investment in NSC, PPF and Government Bonds.**

$H_0$ : There is no significant relationship between annual income and investment in NSC, PPF and Government Bonds.  $H_1$ : There is a significant relationship between annual

income and investment in NSC, PPF and Government Bonds.

**Table 4.1.5. Annual income and investment in NSC,PPF and Government Bonds.**

O	E	O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
7	7.2	-0.2	0.04	0.005556
55	54	1	1	0.018519
20	19.8	0.2	0.04	0.00202
9	9.8	-0.8	0.64	0.065306
9	9.2	-0.2	0.04	0.004348
				0.26242

Degree of freedom= (r-1)\*(c-1) at 5% level of significance

$$= (4-1)*(2-1) = 3 \text{ Table Value} = 7.815$$

Calculated value = 1.372054  
 Calculated value at 5% significance level and 3 degree of freedom is less than the table value. So, we accept the null hypothesis. There is no significance relationship between the annual income and investment in NSC, PPF and Government Bonds.

## **FINDINGS**

The study identified that most of the respondents are investing in fixed deposits and in insurance products..In this study, most of the respondents are aware of the features of public provident fund, fixed deposit and insurance products. They are least aware of the debt instruments and various equity instruments. Majority of the respondents are preferring rate of return as the base in their investment alternatives.Majority of the respondents are considering the rate of return as the main factor in their investment decision making. Most of the respondents are satisfied with the prompt delivery of statement and transaction summary. The study statistically tested and validated that, there is no significant relationship between annual income and investment in equity. There is no significant relationship between annual income



and investment in mutual funds. There is no significant relationship between annual income and investment in insurance products. There is no significant relationship between annual income and investment in debt instruments. There is no significant relationship between annual income and investment in NSC, PPF and Government Bonds.

## **SUGGESTION**

It is clearly identified that the majority of the respondents are not aware of the equity shares. So proper awareness program should be given to the working women in order to increase their awareness on them. The company should give encouragement program to the women to improve their investment pattern and their frequency. Proper measures should be taken to improve the awareness of investors in bonds and NSC. Information about the Tax advantages level of the respondents are very low. It should be improved.

## **CONCLUSION**

The study entitled “A Study on Investment Behaviour and Pattern of Working Women with Special Reference to Thrissur District” is mainly intended to focus on the awareness level of women as regard to various investment alternatives and their preference on various investment schemes. The study also identified various factors affecting their investment decision and their satisfaction level.

Women are generally go for the safe and secure investment. This study also revealed that the respondents are mainly invested in Bank fixed deposit and insurance products. They are not aware about the equity instruments and various corporate bonds. When we consider the investment alternative there should be proper awareness and assistance to make the decisions better. But in this study, it reveals that the assistance from the side of consultant is very low. It will adversely affect the investment decision of the respondents. This study also can conclude in the same way because majority of the respondents state that the reasons for their investment are their children and their family. The return of the investment is just after the family and their security.

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**A STUDY ON INVESTORS ATTITUDE TOWARDS MUTUAL FUND AS AN  
INVESTMENT WITH SPECIAL REFERENCE TO ERNAKULAM DISTRICT**

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**ABSTRACT**

A mutual fund uses the money raised from investors to purchase these assets, which is expressly authorized under its stated investment purpose. This study aims to understand the level of investor attitudes towards mutual funds by analysing demographic factors and the size of savings. If the mutual fund has a positive image in the investor mentality, then there are many opportunities for potential investors. Primary data were collected from 150 respondents residing in Ernakulam District using a convenience sampling methodology. The findings indicated that most respondents were not aware of the various functions of mutual funds.

**Keywords: Mutual funds, Depository participants, Fund Sponsor, Asset Management Companies**

**INTRODUCTION**

A mutual fund pools the money of people with certain investment goals. The money invested in various securities depending on the objectives of the mutual fund, scheme and the profits

or loss is shared among investors in proportion to their investment. Investment in securities is spread over a broad spectrum of industries and sectors.

There are many investment avenues available today in the financial market for an investor with an investable surplus. An understanding on behavioural process and outcome is crucial for financial decision makers. Theoretically in behavioural finance, demographic and socioeconomic characteristic of market participants influence the investment decision.

This study finds differently from previous studies that individuals prefer to invest in mutual funds rather than a bank deposit, which is likely the new look. Therefore, this study attempts to determine the relationship between the various demographic characteristics and investor attitudes towards mutual funds.

## **REVIEW OF LITERATURE**

**(Wagle, 2020 september)**, The paper has the following major discoveries. Initially it was found out that majority of Nepali investors were male in gender. Then it was discovered that investors were investing in mutual funds without adequate knowledge. Furthermore, investors in common stock made the mutual funds effective. Moreover, the correlation among all variables was positively significant.

**(Tamilselvan P, 2018)**, Volatility in the financial markets creates the importance to study about mutual funds. The study helps to understand the investor's expectation to the upcoming financial innovation.

**(Vijakumar, 2017)**, The study analyses 200 respondents constitute to the region of Pondicherry to understand the investor's attitude towards mutual fund. It focused on the demographic factors and benefits delivered by mutual funds to investors. It was find out that majority of investors did not have any sort of attitude even though they were a regular investor in mutual fund.

## **STATEMENT OF THE PROBLEM**

The study has been conducted with the objective of investigating the attitude of investors towards mutual funds in the district of Ernakulam. Investment culture among the people of a country is an essential prerequisite for capital formation and faster growth of an economy. The study is thus intended to focus on the investment pattern on mutual fund by different

sectors of people in Ernakulam District.

## **OBJECTIVES OF THE STUDY**

- To analyse the impact of different demographics on an investor's attitude toward mutual funds.
- To identify the impact that saving has on the investor's attitude towards mutual funds.
- To determine the factors responsible for the selection of mutual fund.

## **TESTING OF HYOTHESIS**

- H<sub>1</sub>: There is no association between age and the attitude towards mutual fund
- H<sub>2</sub>: There is no association between gender and the attitude towards mutual fund
- H<sub>3</sub>: There is no association between income and the attitude towards mutual fund
- H<sub>4</sub>: There is no association between educational qualification and the attitude towards mutual fund
- H<sub>5</sub>: There is no association between occupation and the attitude towards mutual fund
- H<sub>6</sub>: There is no association between amount of savings and the attitude towards mutual fund

## **SCOPE OF THE STUDY**

The purpose of the study is to find out why different class of people has different perception to mutual fund as an investment in Ernakulum District.

## **RESEARCH METHODOLOGY**

The population of the study was investors of mutual fund in Ernakulum district. The convenience sampling methodology was followed to select respondents from among mutual fund investors in the Ernakulum district. Both primary and secondary data used for the study. Primary data is gathered from 150 respondents through a structured online questionnaire.

## **RESULTS AND DISCUSSION**

In this study, 150 investors in the district of Ernakulam were taken into account. The data thus collected were first compiled and then analysed using the statistical technique Chi square test. In this research, we attempt to determine if there is a link between a selected

demographic variable and investor attitudes toward mutual funds.

Table 1: Association between age and attitude towards the mutual fund

<b>Attitude Level</b>				
<b>Age</b>	<b>Positive</b>	<b>Neutral</b>	<b>Negative</b>	<b>Total</b>
Up to 25	15	8	1	24
25-35	7	18	29	54
35-45	6	16	24	46
Above 45	10	4	12	26
Total	38	46	66	150

(Source: primary data)

<b>Chi-Square</b>			
	<b>Value</b>	<b>df</b>	<b>Asymptotic Significance</b>
Pearson Chi-Square	2.866	6	0.825

Results of chi-square test of independence presented in the table 1 are 2.866 and  $p > 0.05$ . Consequently, there is no significant relationship between age and attitude to mutual funds. Hence,  $H_1$  is accepted in the study.

Table 2: Association between gender and attitude towards the mutual fund

<b>Attitude Level</b>				
<b>Gender</b>	<b>Positive</b>	<b>Neutral</b>	<b>Negative</b>	<b>Total</b>
Male	21	32	52	105
Female	17	14	14	45
Total	38	46	66	150

(Source: primary data)

<b>Chi- Square</b>			
	Value	df	Asymptotic Significance
Pearson Chi-Square	9.599	2	.008

Results of chi-square test of independence presented in the table are 9.599 and  $p < 0.05$ . There is a very strong evidence of a relationship between gender and attitude towards mutual fund. Therefore, there is a significant relationship between gender and attitudes toward mutual funds. Hence,  $H_2$  is rejected in the study and alternative hypothesis is accepted.

Table 3: Association between education and attitude towards the mutual fund

<b>Attitude Level</b>				
<b>Education</b>	<b>Positive</b>	<b>Neutral</b>	<b>Negative</b>	<b>Total</b>
SSLC	1	2	16	19
Plus two	3	8	13	24
Degree	11	11	15	37
PG	10	13	14	37
Others	13	12	8	33
Total	38	46	66	150

*(Source: primary data)*

<b>Chi-Square</b>			
	Value	df	Asymptotic Significance
Pearson Chi-Square	83.399	8	.000

Results of chi-square test of independence presented in the table 3 are 83.399 and  $p < 0.001$ . There is a very strong evidence of a relationship between education and attitude towards mutual fund. As a result, there is a significant relationship between academic qualifications and attitudes toward mutual funds. Hence,  $H_3$  is rejected in the study and alternative hypothesis is accepted.

Table 4: Association between monthly income and attitude towards the mutual fund

<b>Attitude Level</b>				
<b>Monthly Income</b>	<b>Positive</b>	<b>Neutral</b>	<b>Negative</b>	<b>Total</b>
Up to 15000	0	0	6	6
15000-30000	4	7	12	23
30000-45000	8	22	29	59
45000-60000	12	7	9	28
above 60000	14	10	10	34
Total	38	46	66	150

*(Source: primary data)*



<b>Chi-Square</b>			
	Value	df	Asymptotic Significance
Pearson Chi-Square	89.445	8	.000

Results of chi-square test of independence presented in the table 4 are 89.445 and  $p < 0.001$ . There is a very strong evidence of a relationship between monthly income and attitude towards mutual fund. Therefore, there is significant link between monthly income and the attitude towards mutual fund. Therefore,  $H_4$  is discarded in the study and the alternative hypothesis is accepted.

Table 5: Association between occupation and attitude towards the mutual fund

<b>Attitude Level</b>				
<b>Occupation</b>	<b>Positive</b>	<b>Neutral</b>	<b>Negative</b>	<b>Total</b>
Government Employees	7	5	5	17
Private Employees	3	10	27	40
Professionals	9	8	14	31
Business	18	16	12	46
Others	1	7	8	16
Total	38	46	66	150

(Source: primary data)

<b>Chi-Square</b>			
	Value	df	Asymptotic Significance
Pearson Chi-Square	60.596	8	.000

Results of chi-square test of independence presented in the table 5 are 60.596 and  $p < 0.001$ . There is a very strong evidence of a relationship between occupation and attitude towards mutual fund. Therefore, there is significant relation between occupation and the attitude towards mutual fund. For this reason,  $H_5$  is rejected in the study and the alternate hypothesis is accepted.

Table 6: Association between amount of saving and attitude towards the mutual fund

<b>Attitude Level</b>				
<b>Savings</b>	<b>Positive</b>	<b>Neutral</b>	<b>Negative</b>	<b>Total</b>
No saving	2	0	11	13
Up to 5000	8	12	13	33
5000-15000	11	15	28	54
More than 15000	17	19	14	50
<b>Total</b>	<b>38</b>	<b>46</b>	<b>66</b>	<b>150</b>

(Source: primary data)

<b>Chi-Square</b>			
	Value	df	Asymptotic Significance
Pearson Chi-Square	28.411	6	.000

Results of chi-square test of independence presented in the table 6 are 28.411 and  $p < 0.05$ . There is a very strong evidence of a relationship between amount of saving and attitude towards mutual fund. Therefore, there is a significant relationship between the amount of savings and the attitude towards mutual funds. Therefore, the  $H_6$  is rejected in the study and the alternate assumption is accepted.

Table 7: Factors affecting attitude towards mutual fund

<b>Factors</b>	<b>Very High (%)</b>	<b>High (%)</b>	<b>Neutral (%)</b>	<b>Low (%)</b>	<b>Very Low (%)</b>
Return potential	3	17	28	20	32
Transparency	5	10	32	26	27
Liquidity	10	13	22	36	19
Flexibility	2	18	32	23	25
Affordability	18	5	17	38	22
Risk exposure	29	16	23	11	21
Repurchase price	29	18	13	21	19
Capital appreciation	8	19	43	13	7
Investment alternatives	28	9	29	16	18
Tax benefits	33	29	16	18	4
Diversification	37	14	20	17	12
Past performance	17	26	15	32	10

*(Source: primary data)*

The table 7 reveals that out of 150 investors; more than half of the investors are not satisfied with the return, transparency, liquidity, flexibility, flexibility, affordability, capital appreciation rather they are exposed to risk and they have to pay more for repurchase of mutual fund. From the study conducted it indicate that majority of investors of mutual fund are not satisfied with their plans.

## **FINDINGS**

- The chi-square test shows that the attitude towards mutual fund does not depend upon the age of investors.
- The chi-square test shows that the attitude towards mutual fund depend upon the gender, level of education, income, occupation of investors.
- There is association between amount of saving and the attitude towards mutual fund. Therefore, attitude towards mutual fund depend upon the amount of saving of investors.
- The study found that investors prefer to invest in mutual funds because of their high return potential, followed by liquidity, agility, transparency and affordability. It indicated that 86 respondents ranked return potential as the first factor responsible for selecting a mutual fund plan.
- Investors in Ernakulam district prefer bank to invest their money rather than Shares, Bonds, Mutual funds, Real estate and Commodity. About 92 Investors rank bank deposit as the first preferred investment avenue.
- The young investors below the age of 35 years prefer Equity based mutual funds because these funds promise more returns yet with a comparatively lesser risk than that of investing directly in equities. These investors are able to maximize their returns with a diversified portfolio, which makes them less prone to volatility and adverse industry fluctuations.

## **CONCLUSION**

It has been observed that most of the respondents are not aware about the latest innovation in the area of mutual fund. Moreover, they do not exploit the various benefits of mutual funds. From the study, it was evident that gender, income, education and occupation do affect the attitude of investors of mutual funds. On the other hand, age does not have significantly influence the investor's attitude towards mutual fund. There is an enormous opportunity for all financial intermediaries to have a mutual fund awareness program and to provide adequate mutual fund training to the investors.

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## **PERCEPTION OF ONLINE COUNTERFEITING AND ITS IMPACT ON CONSUMER BUYING BEHAVIOUR**

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### **ABSTRACT**

This study is to analyse public perception on online counterfeiting and its impact on consumer buying behaviour. The counterfeit products reduce the sales of original products Therefore research finding can help marketers better understand how and why consumers are driven to purchase counterfeit products rather than the original and thus to create effective marketing campaigns and strategies

**Key words : Counterfeiting ,public perception**

### **INTRODUCTION: -**

The market for consumer goods is immensely significant in India in terms of both magnitude and spending capacity. This makes it a country that is attractive for products counterfeiters. Counterfeiting is a federal and state crime, involving the manufacturing or distribution of goods under someone else name, and without their permission. To Counterfeit means to imitate something authentic with the intention of replacing the original for use in illegal transactions. The study attempts to investigate perception of online counterfeit and its impact on consumer buying behaviour. The study is based on primary data collected using structured questionnaire from customers doing online shopping.

## **STATEMENT OF THE PROBLEM: -**

The main purpose behind my research study is to examine impact of online counterfeit products on consumer buying behaviour hardly found in literature. Thus it is essential to understand how the counterfeit product are affecting the buying behaviour of customer. This study is relevant in the current scenario. The study is mainly focuses on to identify the factors that helps to consumers in differentiating counterfeit products with original or branded product and the find the factors which attract them to purchase counterfeit products and also the role of online platforms in buying counterfeit products.

## **OBJECTIVES OF THE STUDY: -**

- To understand the concept counterfeiting
- To identify the factors that helps the consumers to differentiate counterfeit products with original products.
- To find out the factors which influence the consumers to buy such counterfeit products.

## **SIGNIFICANCE OF THE STUDY**

Counterfeiting product has become a global issue over the years. Counterfeit merchandise cut in to profit and harms the brand owner's reputation. They always find new ways to serve customers as long as the demand is thriving. Recently the internet has become a major enabler in the sale of online counterfeit products. The consumers buy the counterfeit products even though they are aware about their negative impacts. Therefore, it is necessary to understand the consumer's propensity to purchase counterfeit products. This study helps to identify the factors that pull the consumers towards counterfeit products.

## **SCOPE OF THE STUDY**

MY study is conducted among a few selected consumers residing in Perumbavoor Municipality, they are the online consumers and they are the recipients to whom the questionnaire is given. The study is done to find out the factors that have an impact on the attitude of consumers towards counterfeit products, which is believed to lead to buying decision.



## RESEARCH METHODOLOGY

Both primary and secondary data sources are used for the study. The secondary data was sourced from internet and some published journals for getting some general and basic knowledge related to my topic. The primary data was gathered using structured Google Form Questionnaire. Percentage analysis is used to analysing the data.

## REVIEW OF LITERATURE

1. Jay P. Kennedy ( 2020 ): This study reviews the problem of counterfeit products online, beginning with a discussion of product counterfeiting from a legal and colloquial perspective including a discussion of deceptive and non-deceptive counterfeits
2. Harun A, Mahmud M, Othman B ,Ali R, Ismael (2020): This study aims to understand the repurchase behaviour of experienced consumers in regards to counterfeit products and their demographics, past purchases, materialism, economic and social factors.
3. Chellasamy A, Varma A.S, Paarakh N (2020) : The objective of the research is to analysis the perception and knowledge levels of different consumers about these products and to identify major factors influencing the consumer purchasing decision on these products.

## DATA ANALYSIS AND DISCUSSION

Variables	Category	Percentage	total
Gender of the respondents	Female	58	100
	Male	42	
Age of the respondents	Below-20	42	100
	20-25	56	
	26-30	2	
	Above 30	0	
Qualification	Undergraduate	72	100
	Graduate	28	
	postgraduate	0	
Status of respondents	Students	92	100
	Employee	8	

	Professional	0	
	Business	0	
Factors which influence to buy a particular brand	Advertisement	50	100
	Attractive packing	24	
	Dealer	510	
	Shop Display	10	
	Friends\Family\relatives	28	
	Word of mouth	12	
	Details of the product	2	
	Quality one other	2	
Policies affect our selection of purchase	Discount policy	78	100
	Promotional policy	22	
List of e-commerce company sends the most fake products in our opinion	Amazon	24	100
	Flipkart	28	
	Snapdeal	18	
	Alibaba	12	
	Myntra	14	
	other	4	
Degree of worry of the people when buying products online or in stores that they may not be authentic.	Strongly agree	10	100
	Agree	44	
	Neutral	36	
	Disagree	8	
	Strongly disagree	2	
Preference of proper education from real owners of the brand about the related fake products	Strongly agree	30	100
	Agree	42	
	Neutral	26	
	Disagree	2	
	Strongly disagree	0	
People who will respond to the company if the product is fake	Yes	42	100
	No	22	
	May be	36	

People who are loyal customers	Yes , always I stick to the same product No, I keep experiencing with new products Rarely Only when quality is important	16 36 16 32	100
Those who collect information before purchasing the product	Yes No May be	76 10 14	100
Purchases from an Online site	Yes No	98 2	100
The crucial factors which influence the final decision of purchasing	Best price Convenience & Time saving Not available in local stores Product service available Product comparison available Others	52 28 16 28 32 4	100
The list of items which purchased through online sites	Apparels Gadgets Books and stationary Footwear Jewellery Fashion accessories Beauty Products Others	12 48 12 42 8 38 24 2	100

Those who go to real store before making the final online purchase.	Always	18	1000
	Never	30	
	Sometimes	52	
The list of visiting the online stores before purchasing a product	1 to 3 online stores	86	100
	4 to 5 online stores	12	
	More than 5 online stores	2	
The ability of the people to distinguish original product with fake products	Yes	36	100
	No	18	
	May be	46	
Table showing those who get satisfaction from fake products as the original product	Yes	18	100
	No	56	
	May be	26	
Satisfaction level from online shopping	Strongly agree	20	100
	Agree	44	
	Neutral	30	
	Disagree	0	
	Strongly disagree	0	

## FINDINGS

- 58% of the respondents are female.
- 56% of the respondents fall within the age group of 20-25.
- 72 % of the respondents are undergraduate.
- 92 % of the respondents belongs to student community.
- Advertisement plays an important factor to buy a particular brand.
- 44 % of the people are worried about their buying products are authentic or not.
- 42 % of the people will report it to the company, if it is a fake product.
- 36 % of the people are not stick into the same product.
- 76 % of the people will collect information before purchasing the product.
- 40 % of the people wants to know about the quality of the product.
- 98 % of the people purchased from online site.

- 86 % the respondents visit 1 to 3 online stores before purchasing a product for getting more accuracy.
- Most of the people are not sure about their ability to distinguish between fake products and original brand.
- 56 % of the respondents get satisfaction from fake products as the original product.
- 44 % of the people are satisfied with online shopping.

## **SUGGESTIONS**

Consumers want to get education from the real owners about the fake products related to their original brand.

Consumers want to get entity details in E-commerce sites, so it will help to avoid the purchase from fake products.

Majority of consumers are of the opinion that counterfeit products are of low quality so the quality should be improved.

Proper promotional schemes of branded product will help to reduce the trading of counterfeit goods.

## **CONCLUSION**

Mass production and information overload, which occurred in the 21<sup>st</sup> century, has made consumers look for individuality and exclusivity in everyday life. During the economic crisis the demand for counterfeit goods has increased. This paper is an effort to explore the perception of online counterfeiting among consumers. After administering the survey result, it is clear that counterfeit products are now becoming more popular through online platforms. Shoppers are buying counterfeit products at an incredibly rapid pace, largely due to it is cheaper compared to original product. Shoppers allow lower income people to have a little brush with prestige, appear more affluent from a distance and perhaps feel better about themselves. This is one reason why consumers buy such products. As counterfeits are cheaper alternatives of more expensive original products, it results in the sale of original products.

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## **A STUDY ON APPLICATIONS OF GRAPH THEORY IN OPERATIONS RESEARCH**

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### **ABSTRACT**

Graph theory is an appropriate dominant tool in combinatorial operations research and in different structural models. Graph theoretical ideas enormously applied by computer discipline applications. They used to predict different types of relations and process dynamics in computer science, physical, biological and social systems. Another aspect is graph coloring applied in resource allotment, assignment and transportation problems. Moreover, transportation network enables flows of people, freight or information, which are occurring along its links. A transport network is a graph model in which the objective is to maximize the flow or minimize the cost within the constraints. The emphasis of this paper is to give an overview about the application of graph theoretical measures to find optimal solutions in different fields of operation research like planning, transportation, allocation.

### **INTRODUCTION**

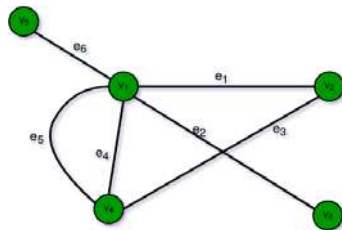
Graph theory and operational research are the key areas of mathematics where we can observe the modelling approach. The comparison of each and every possible alternative of OR and Graph will help to grow the social and business areas. The continues change in social and business environment has put forward decision making, a burdensome task to accomplish

the needs of management and other areas. Within a short time period itself, we can see the upsurge of countless issues in different fields. In this scenario, OR and graph theoretic approach will meet the criteria of industries and business for analyzing the reasons of failure, implementation of results etc. In that case, graph theory aid us to formulate the mathematical structures by using the set of vertices and edges and OR gives the analytical method for problem solving and decision making. Various applications of graph theory and OR are applied in the area of computer technology, communication science, architecture, combinatory etc. The systematic approach of OR and formulation of mathematical structures using graph will together work as an efficient tool of mathematics in the fields related to management, business, industries etc.

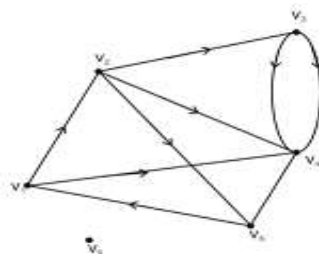
### PRELIMINARIES:

**Graph:** A graph  $G = G(V, E)$  consists of two components:

- I. The finite set of vertices  $V$ , also called points or nodes, and
- II. The finite set of edges  $E$ , also called lines or arcs connecting pair of vertices.



**Directed graph:** A graph is said to be the directed graph or digraph if it is required to associate a direction with each edge of the graph.



**Sub graphs:** If  $G(V, E)$  is a directed or undirected, then the graph  $H(V', E')$  obtained by deleting few vertices and edges from  $G$  is called a sub graph of  $G$ .



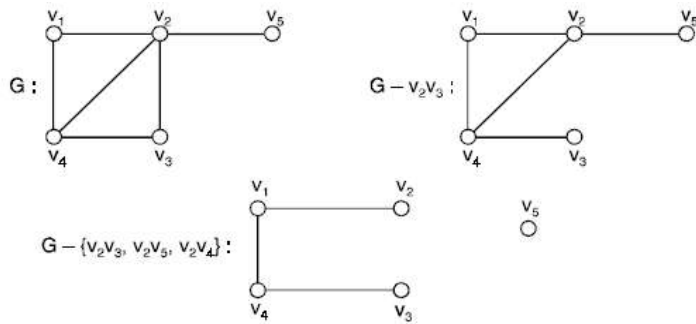
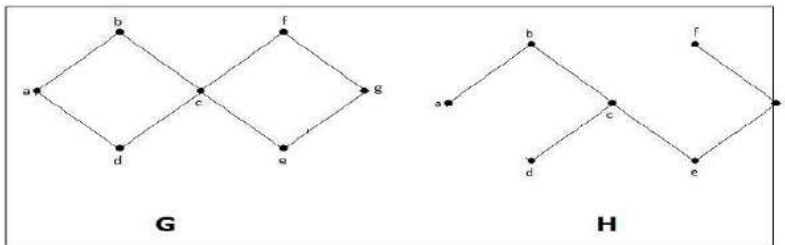
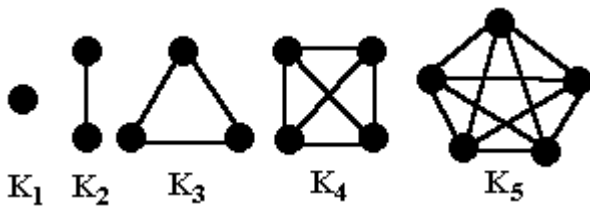


Fig. 21(b). Deleting edges from a graph.

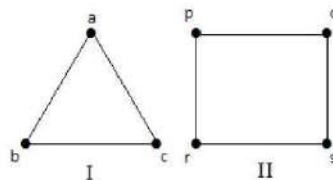
**Spanning sub graph:** A sub graph  $H (V', E')$  of a given directed or undirected graph  $G (V, E)$  is called a spanning sub graph of  $G$  if  $H$  contains all vertices of  $G$ .



**Complete graph:** A complete digraph is a directed graph in which every pair of distinct vertices is connected by a pair of unique edges.

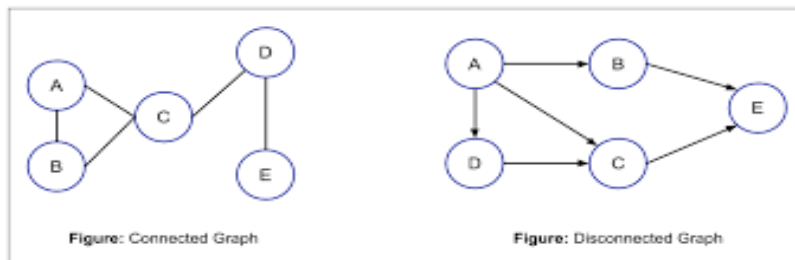


**Regular graph:** A graph  $G$  is said to be regular, if all of its vertices have the same degree. In a graph, if the degree of each vertex is 'k', then the graph is called a 'k-regular graph'.

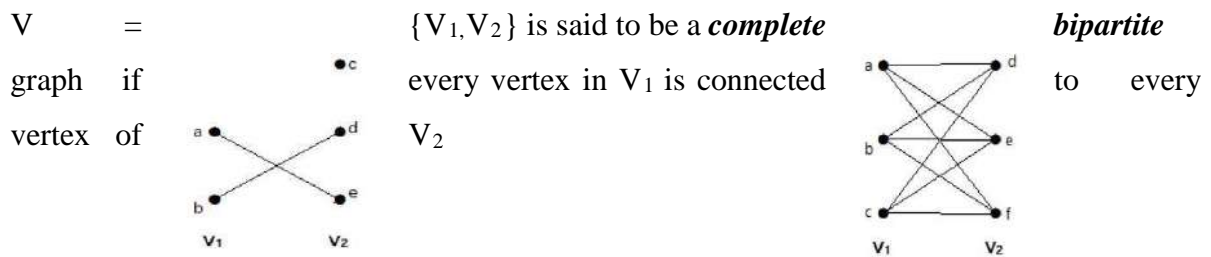


In both the graphs, all the vertices have degree 2. They are called 2-Regular Graphs.

**Connected graph:** A graph is said to be connected, if there exists at least one path between every pair of its vertices, otherwise it is called disconnected.



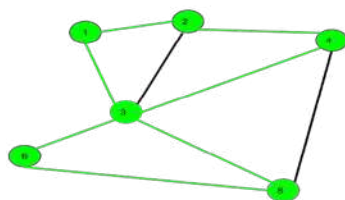
**Bipartite graph:** A simple graph  $G = (V, E)$  with vertex partition  $V = \{V_1, V_2\}$  is called a bipartite graph if every edge of  $E$  joins a vertex in  $V_1$  to a vertex in  $V_2$ . A bipartite graph 'G',  $G = (V, E)$  with partition



Bipartite graph

Complete Bipartite graph

**Walk:** A walk is a sequence of vertices and edges that begins at  $v_i$  and travels along edges to  $v_j$  so that no edge appears more than once. A walk is said to be closed walk if it is possible that a walk begins and end at the same vertices,  $v_i = v_j$ . Otherwise, the walk is called open.



**Path:** It is walk through a sequence  $v_0, v_1, v_2, \dots, v_n$  of vertices each adjacent to the next, without repetition of vertices. Length of a path is the number of edges in it.

**Trail or simple path:** A trail or simple path from a vertex  $u$  to  $v$  is a path that does not involve a repeated edge.

**Circuit or Cycle:** It is a closed walk of non-zero length that contains no repeated edge where start and end vertex is same.

### **Euler graph:**

Eulerian Path is a path in graph that visits every edge exactly once. Eulerian Circuit is an Eulerian Path which starts and ends on the same vertex. A graph that contains an Euler tour is called Eulerian graph.

### **Hamiltonian graphs:**

If there exists a closed walk in the connected graph that visits every vertex of the graph exactly once. (Except starting vertex) without repeating the edges, then such a graph is called as a Hamiltonian graph

## **HISTORY OF GRAPH THEORY**

The root of the Graph theory began with the Königsberg bridge problem in 1735. The seven bridge of Königsberg is a historical problem was solved by Leonard Euler (1707-1782), the father of graph theory. He was a Swiss mathematician, physicist, astronomer, geographer, logician and engineer who founded the studies of graph theory and topology which made influential discoveries in mathematics.

Euler solved this bridge problem in 1736 by using the concept of graph theory. The Königsberg bridge puzzle is universally accepted as the problem that gave birth to graph theory. The problem asked whether one could cross all seven bridges of the city of Königsberg exactly once and return to the starting point. So many people tried to solve this problem but all attempts were unsuccessful.

## **KONIGSBERG BRIDGE PROBLEM**

The city of Königsberg was located in the Pregel River in Prussia. The river was divided into 4 separate lands, including the island of Kneiphof. The four regions are linked to each other by seven bridges as shown in the figure. The key of Euler was very simple to prove that the problem is unsolvable. Euler redrawn the fig 1.1 into a graph theoretical structure by replacing each land area by a point and each bridge as an edge connecting the corresponding regions as in fig 1.2.

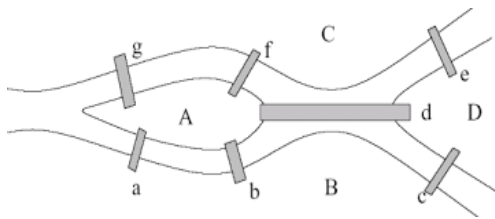


Fig 1.1

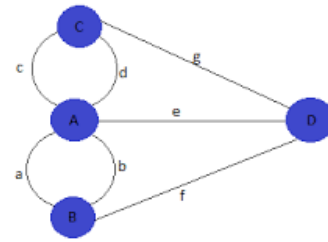


Fig 1.2

To prove that the problem is unsolvable it is enough to show that the graph fig 1.2 cannot be traversed in certain way. For that Euler developed a certain criterion for a given graph to be traversable, and shows that the graph is traversable if every point is incident with an even number of lines. But in Konigsberg bridge problem not every point is incident with an even number of lines. He did this by avoiding the unnecessary details and reduced into essential elements, which later formed a more abstract structure called a Graph.

## OPERATIONS RESEARCH

Operations research is a scientific and analytical technique for solving problems and making precise decision for the management of the organization. The major task is to solve the unsolvable problems, by breaking down into different components to mathematically analyze and develop a potential solution and workable key for the existing issue. The term operational research; the systematic and scientific study of operations was first mold in 1940 by MC Closky and Trefthen of the United Kingdom. Operational research has its beginning in World War II, were a team of British scientists set out to make decisions regarding the best utilization of war material. Today OR is a dominant and indispensable decision-making tool; that seeks the optimal state in all conditions and thus provides optimal solutions to the organizational problems. The distinct approach is to develop a scientific model of the system incorporating measurements of factors such as chance and risks to predict and compare the outcomes of alternative decisions, strategies or controls.

In India OR came into existence in 1949 with an initiative of an OR unit at the Regional Research Laboratory at Hyderabad, for planning and organizing research. Later in 1957, operational research society of India was founded and provide a forum for the OR scientists to widen the visuals by the exchange of knowledge with other countries, affiliated to International Federation of OR society (IFROS). Due to multi-disciplinary character of OR,

makes a wide scope of application in different areas. Since there is no precise definition of for OR, one among them is “OR is the application of method of science to complex problems in the direction and management of large system of men, machines, materials and money in industry, business and defense.

## **APPLICATION OF GRAPH THEORY IN OR**

Graph theory has become a useful tool for yielding the new OR models and it is an efficient way to express the relationship between the numbers of elements of a system by means of a graph. This paper is designed to showcase the relevance of graph theory in OR. A few foremost applications of graph theory in OR are Travelling salesman problem, network problem, finding the shortest spanning tree in weighted graph obtaining an optimal matching of jobs and men and locating the shortest path between two vertices in graph etc. Some important operational research problems solved by using graphs are explained below.

## **TRANSPORT NETWORK**

Nowadays, transport is the basis for the functioning of national and global economics. The proper operation of the transport sector must have the right tool to model, analyze and optimize its elements. The best and natural way to describe the transport system was a graph network. A transport network graph is used to model the transportation of commodity from one place to another place. The objective is to maximize the flow or minimize the cost within the flux. A simple connected weighted digraph  $G$  is called a transport network, provided the weights of each edge should be a non-negative number. Graph theory is foundational implement in transport network system.

“When different points, whether in one-two-or three-dimensional space are limited together into a structure they are said to form a network. Such networks, by carrying flows of goods, people, information or anything else that is moved from one place to another, give rise to regional transport system” (Robinson and Bamford, 1978)

One common feature of transportation system is the existence of a capacity associated with each edge. In transport geography, most networks have an obvious spatial network, which tend to be defined by more by their links than by their nodes. A telecommunication system, can also be represented as a network. It is important to analyze the maximum rate of flow from one destination to another destination in highways, telephone lines, rail road’s etc.

## TRAVELLING SALESMAN PROBLEM

Travelling salesman problem is the hardest computational problem, as it does not have any quick solution. It is one among the most intensively studied problem in optimization, and was formulated in 1930. The hardness of TSP will increase simultaneously with number of places considered. TSP is a travelling door-to –door seller of goods.

Suppose a sales man is required to visit a certain number of places allotted to him. The problem is to find a shortest route starts from his home place, passes through each city exactly in once and return to the home place where he begin. Representing each city by vertices and roads between them by edges will form a graph. The graph obtained from this shows that, every edge  $e_i$ , is associated with a real number,  $w(e_i)$ . If each places have road to every other place, a complete weighted graph is obtained. This will results into numerous Hamiltonian circuits but the analyzer must pick one of the smallest sum of distances. The total number of different Hamilton circuit in a complete graph of  $n$  vertices is  $\frac{(n-1)!}{2}$ . Analyzing the table below, we can observe the complexity of TSP.

n	3	4	10	40	100
$\frac{(n-1)!}{2}$	1	6	181400	1.0198941e4 6	4.66631077e15 5

In operational research, finding the shortest and most efficient route for a person to a given list of destination is challenge in travelling salesman problem. Assignment problem is used for solving TSP. In that the best method is the Hungarian method.

## GAME THEORY

Game theory is the science of strategy and is also the theory of independent and interdependent decision making. It is concerned with decision making in organization where the outcome depends on the decision of 2 or more independent players. It attempts to determine mathematically and logically the actions that “players” should take to serve the best. For example, advertising and marketing campaigns by competitive business firms, election etc. The action of each competitor may be either finite or infinite. This competitive

situation can also be called 'Game'. The following are the properties of game.

- Each player has a finite number of strategies available to him.
- A play of game takes place when each player employs his strategy.
- Every game results in an outcome.

A game is called 2- person game according as it is played between two or more persons.

Therefore, according to game theory, the actions and choices of all participants affect the outcome of each. Another classification is based on the randomness introduced in the game such as dice or cards. A game in which each player knows exact position of game is called perfect-information game. Otherwise, it is called imperfect- information game.

Now a two-person, perfect information finite game without change, moves can be depicted naturally by a digraph. The vertices represent the position in the game and edges represent the moves. There is a directed edge from  $v_i$  to  $v_j$  if the game can be transformed from position  $v_i$  to  $v_j$  by a move permissible by the rules of the game.

## **CONCLUSION**

The aim of this paper is to give an overview of the relevance of graph theoretical concepts in various areas of operations research. It has been shown that graph theoretic models often afford new insight into a wide variety of operations research problems. There is virtually no end to the list of problems that can be solved with graph theory. Graph theory and operations research both are becoming significant as these can be applied to many practical problems effectively.

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## **THE ART OF DATA MINING FOR CREATING MODELS FOR THE BANKING DOMAIN**

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### **ABSTRACT**

Customer Relationship Management” (CRM) is an important and commonly used Data mining application in the banking domain to interact with customers in proper and effective way. As banking is considered as a service industry, the purpose of maintaining a strong and effective Customer Relationship Management is a critical issue [1]. Models created by Data mining algorithms can play a significant role in Customer Relationship Management in the banking domain especially for predicting the loan credibility behaviour of a customer. Before creating the model, the quality of data being improved by data preprocessing techniques especially feature selection. The classification technique aims to accurately predict the target class such as whether to approve or reject the loan for each case in the data. The way of Data mining process on the credit data set is demonstrated here. Different Data mining classification models are generated and evaluated to identify the loan applicants as eligible or not eligible for the loan.

***Keywords: Data preprocessing, Classification, CRM, Random Forest, Feature Selection***

## INTRODUCTION

The different applications of Data mining that can be used in the banking sector are Customer segmentation, Banking profitability, Credit scoring and approval, Predicting payment from Customers, Marketing, Detecting fraud transactions, Cash management and forecasting operations, Optimising stock portfolios, and Ranking investments [2]. The primary goal of a bank is to lend the money generated by it from various sources. The lending of money to customers is very easy but its recovery is a hard process. Therefore, the primary objective of the banks as lenders is to ensure the profitability of the loans and advances sanctioned by them. In order to maintain CRM, grant loans to the reliable customers who can repay it from reasonably reliable sources within a stipulated time. Banks hold huge volumes of customer transaction data on daily basis. Data mining tools help to analyse these data and to convert into knowledge that can be used for the prediction of loan credibility behaviour of a customer. CRM can be maintained with in the banking industry by predicting the loan credibility behaviour of a customer. Data mining analyzes huge data collected from the banking transactions and finally summarize it into meaningful knowledge. This knowledge help the bankers for the proper decision making process and it leads to the smooth functioning of the organization. After the formulation of problem statement, collect the relevant data and apply some preprocessing techniques to transform original data into a suitable form that can be applied for mining process. Finally apply data mining functionality especially classification to catagorise the customer into two groups such as those who can pay the loan amount promptly or they do not.

## DATA COLLECTION

The data were collected from a UCI depository. The attributes are listed in Table -1

SI	Name of attribute
1	Checking_Status
2	Duration
3	Credit_History
4	Purpose
5	Credit_Amount

6	Savings_Status
7	Employment
8	Installment_Commitment
9	Personel_Status
10	Other_Parties
11	Residence_Since
12	Property_Magnitude
13	Age
14	Other_Payment_Plans
15	Housing
16	Existing_Credits
17	Job
18	Num_Dependents
19	Own_Telephone
20	Foreign_Worker
21	Class

Table 1 – List of Attributes

## DATA PRE PROCESSING

The customer transactions data collected from the banking domain may contain duplicate values, missing values, noise or inconsistency. This affects the reliability of mining process. If the user believes that the data are dirty, and then they will not trust the results of the data mining process that has been applied to this data [5]. A data mining process with high quality of data will produce accurate data mining results. To improve the quality of data and consequently the mining results, data preprocessing have to be done on the collected data. Data preprocessing is one of the critical step in data mining process which deals with preparation and transformation from the initial data set to the final data set[4]. The following categories of data pre processing are applied to convert initial data set to final data set.

- Data cleaning
- Data integration

- Data transformation
- Data reduction

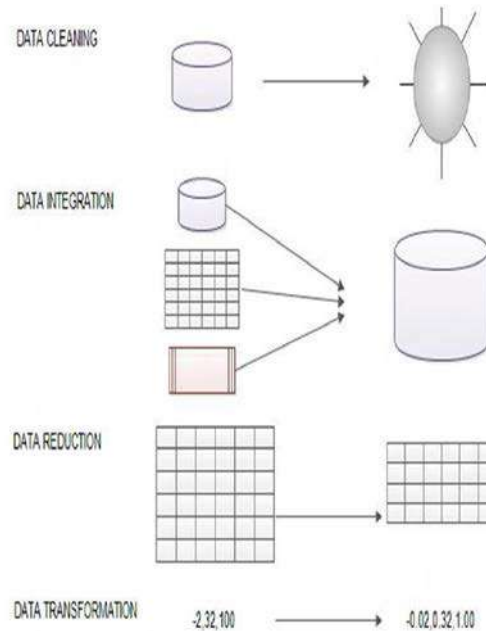


Figure - 1: Data Pre-processing methods

In order to apply any of the data pre-processing technique, the data should be in proper format. So conversion of data obtained into a suitable form before applying the pre-processing steps is mandatory. The excel format has to be converted into respective formats (.csv,.arff) required for the processing of various data mining models. Data pre-processing of banking data start from processing duplicate and missing values. The missing values are substituted by another computed value such as mean median or mode. For example, all the missed “Jobs” in the dataset are replaced with the term “Business” as it is the most occurred job. Label Encoding is a method for data transformation. It will convert labels in the credit data set into the numeric form so that it can be easily transformed into a machine-readable form. The complexity of the dataset can be reduced by applying methods of data reduction.. Data reduction is a technique to reduce the volume of initial data set and should produce the same performance [5].

Feature selection is an important reduction method. Feature selection has proven in both theory and practice to be effective in enhancing learning efficiency, increasing predictive accuracy and reducing the complexity of learned results. [6,7] . Table 2 represents the correctly classified accuracy and incorrectly classified accuracy obtained by each of the feature selection algorithms applied on the credit data set.

<b>Feature Selection</b>	<b>Time</b>	<b>Correctly classified</b>	<b>Incorrectly classified</b>
Chisquared	0.03	78.4	21.6
Filtered	0.06	74.7	25.3
InfoGain	0.03	74.7	25.3
OneR	0.03	96.1	3.9
Relief	0.06	60.4	39.6

Table- 2: Performance metric of feature selection algorithms

## **CLASSIFICATION**

Classification is used in scenarios where we need to identify the category or class into which a new observation might belong. Classification is one of the data analysis methods that predict class labels [7]. There are more classification methods such as Statistical-based, Distance-based, Decision tree-based, Neural network-based, Rule-based [8]. Choosing the correct classification method thus becomes very important for obtaining accurate results. Random Forest is now known to be one of the most efficient classification methods [9]. In order to classify a customer as “eligible customer” or “not eligible customer” using credit dataset binary classification method is used. The process of classification divides the dataset into two parts , one for creating the model called training dataset and other for testing the model called testing dataset.

The various classification algorithms are applied on the credit data set are JRip, ZeroR, SMO, Adaboost, Random Forest, Kstar, Ridor, and DTNB. Accuracy is a measurement to evaluate the efficiency of each classifier. The other mode of evaluating performance are,

Kappa Statistic, and, Mean Absolute Error. These metrics are used to compare and evaluate which classification algorithm is better for the loan credibility prediction. The classification performance based on the above measures is described in the table and the process of classification is demonstrated in the Figure 2. From the Table 3 it is clear that the Random Forest classification algorithm produced better accuracy on the credit data set.

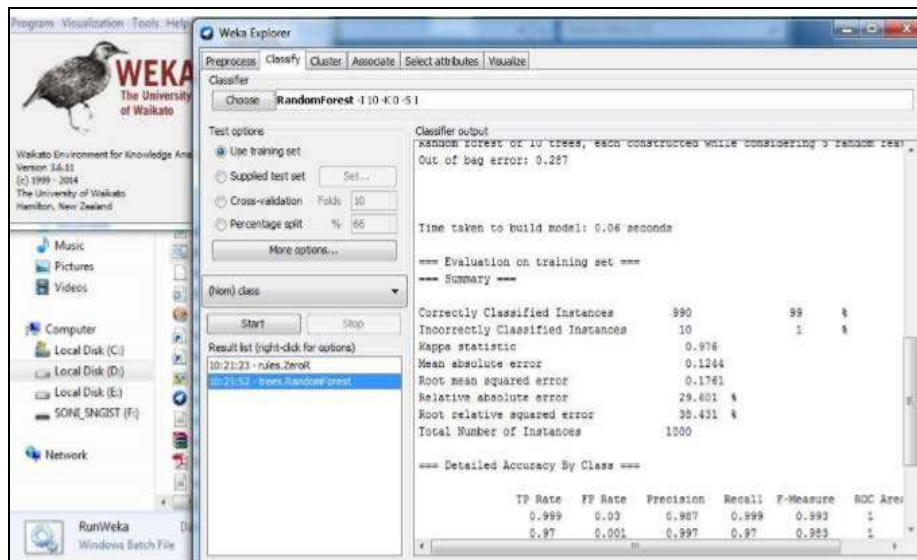


Figure 2: Classification using Weka

Classifiers	Accuracy (%)	Kappa	MAE
JRip	74.3	0.346	0.366
ZeroR	70	0	0.42
SMO	78.4	0.45	0.216
Adaboost	73.7	0.225	0.342
Random Forest	99	0.976	0.124
Ridor	76	0.2701	0.24
DTNB	71.1	0.394	0.362

Table 3: Classification Performance

The figure 3 represents the classification accuracy, figure 4 represents classification Kappa

metric and figure 5 represents Classification MAE metric. From the above graphs , it is clear that Random Forest algorithm can perform better for classifying the customer as “eligible customer “ or “not eligible customer” for issuing the loan.

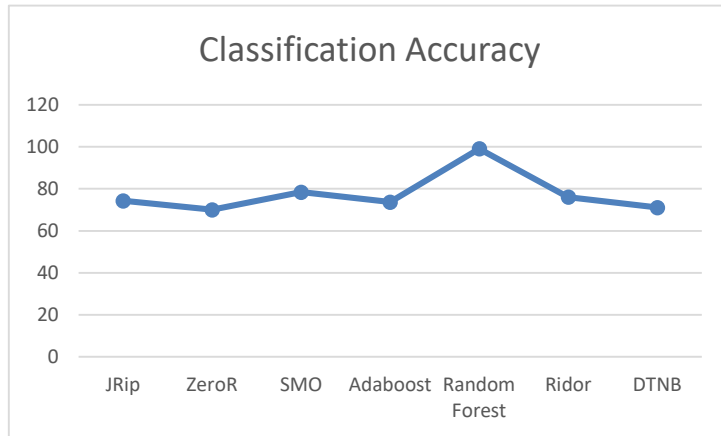


Figure 3: Classification Accuracy

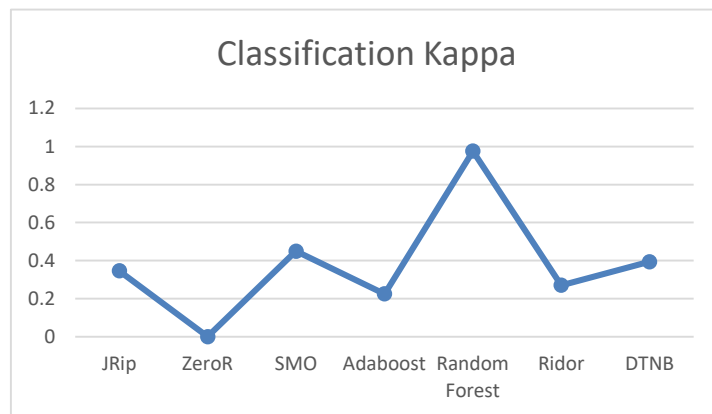


Figure 4: Classification Kappa metric

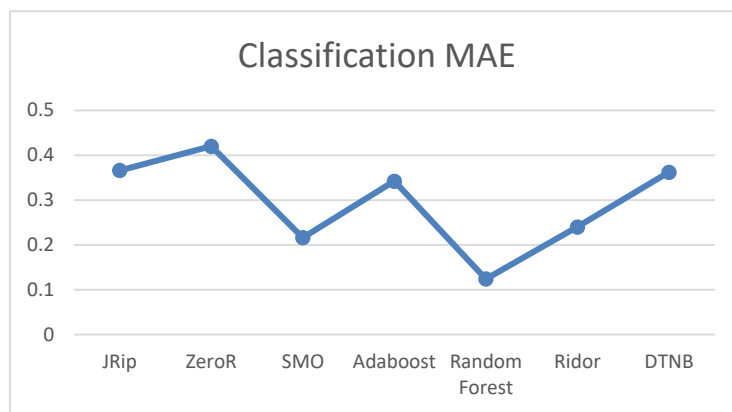


Figure 5: Classification MAE metric

## TECHNOLOGY USED

Weka is a powerful tool that contains collection of machine learning algorithms for data mining tasks such as data preparation, classification, regression, clustering, association rules mining, and visualization. The figure 5 represents the various operations that can be performed in Weka.

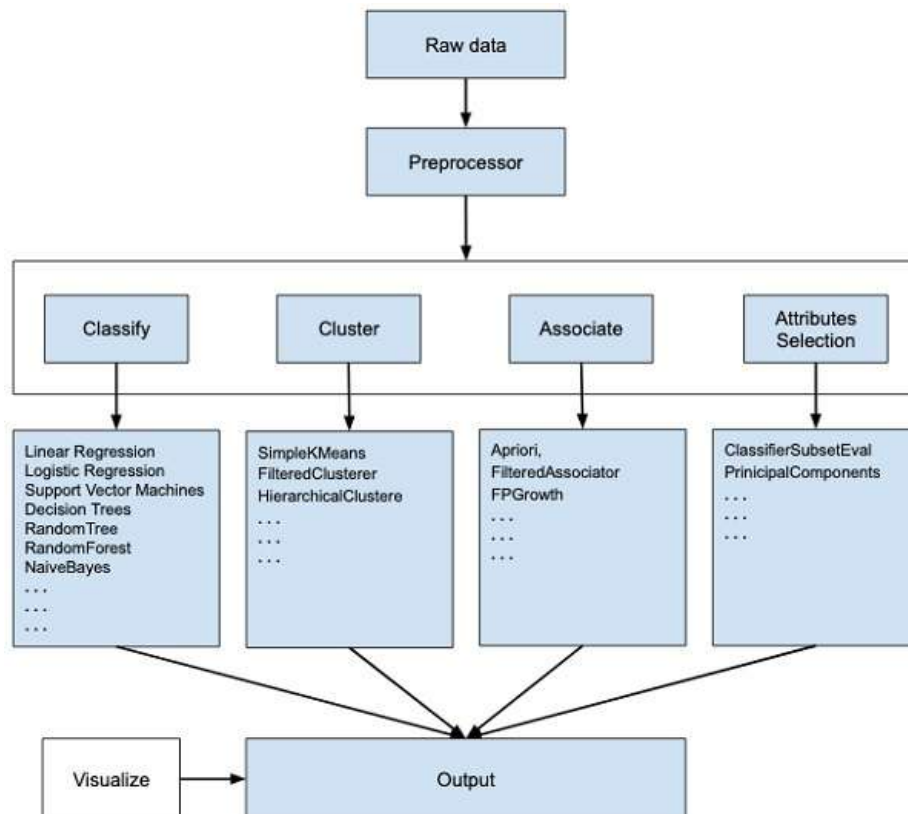


Figure 5: Operations of Weka

The process start with the raw data set and apply preprocessing tools to clean the raw data set into preprocessed dataset that can be used for mining operations. The data mining algorithms were applied on this preprocessed dataset. The different data mining operations are **Classify**, **Cluster**, or **Associate**. The **Attributes Selection** allows the automatic selection of features to create a reduced dataset. Then, WEKA prepared statistical output of the model processing using visualization tools. The various models can be applied on the same dataset. Thus, WEKA results in a fast development of data mining models on the whole.



## **FUTURE SCOPE**

The main focus of my work is the design of data mining models to predict the customers who repay loan amount promptly from those who do not . From the experiment it is clear that the classification algorithm Random Forest produced better accuracy after applying the feature selection methods. In future, the model creation can be extended to apply for different binary classification problems and these can also be applied to handle large amount of data using some big data technologies .

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## **COMPARATIVE EFFECT OF YOGIC EXERCISE AND PHYSICAL EXERCISE ON BMI OF ELEMENTARY SCHOOL GIRLS**

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### **ABSTRACT**

The study aims to compare the efficacy of yogic exercise and physical exercise in controlling the BMI of elementary school girls. A pre-test post-test control group design was adopted for the study. Three intact divisions of sixth grade girls (n = 97) were assigned randomly into a waitlist control group, yogic exercise group and physical exercise group. The groups were pre-tested for BMI, followed by 30-days pedagogic intervention with yogic or physical exercise for experimental group. Analysis exposed that, though both yogic exercise and physical exercise are effective in controlling BMI of elementary school girls, the yogic exercise is significantly better than the physical exercise.

### **INTRODUCTION**

Childhood obesity is a major public health challenge and its prevalence continues to increase in many countries. During the past two decades, the prevalence of overweight and obesity in children has increased worldwide (WHO, 2018). Excess fat in childhood is a risk factor for later adult disease and is associated with impaired health during childhood itself, including increased risk of hypertension, insulin resistance, fatty liver disease, orthopedic

dysfunction and psycho-social distress (Gonzalez-Alvarez, Lazaro-Alquezar & Simon-Fernandez, 2020; NCD Risk Factor Collaboration, 2017). The World Obesity Federation released the first Atlas of Childhood Obesity in 2019, presenting the country-specific prevalence of obesity by age groups and sex, and calculated risk scores for future obesity (World Obesity Federation, 2022). The number of school-aged children and adolescents living with obesity is predicted to rise from 150 million worldwide to over 250 million by 2030 (Shah, Tombeau, Fuller, Birken & Anderson, 2020). Once established, obesity in children (as in adults) is hard to reverse. Therefore, schools have an important role in the development of children by identifying those with low physical fitness and by promoting health behaviors such as encouraging children to be active. Though physical education has already found its place in the school curriculum, it is often neglected, and the period allotted in the school timetable is often utilized for teaching of other subjects. Studies conducted on pre-adolescent children have brought that, girls are significantly more obese than boys (Maruf, Aronu, Chukwuegbu & Aronu, 2013; Nayak & VinodBhat, 2011). Though yoga has introduced in many schools in recent years, physical exercise still continues to be the most popular physical education activity among girls due to multiple reasons. In this context, the present study is a modest attempt to compare the effectiveness of yogic exercise and physical exercise in reducing BMI of primary school girls.

## **OBJECTIVES OF THE STUDY**

- 1) To find out the effectiveness of yogic exercise on BMI of elementary school girls
- 2) To find out the effectiveness of physical exercise on BMI of elementary school girls
- 3) To compare the effectiveness of yogic exercise and physical exercise on BMI of elementary school girls.

## **HYPOTHESES OF THE STUDY**

- 1) Yogic exercise will have significant effect on the BMI of elementary school girls.
- 2) Physical exercise will have significant effect on the BMI of elementary school girls.
- 3) There will be no significant difference between yogic exercise and physical exercise with respect to their effect on the BMI of elementary school girls.

## **METHODOLOGY**

The study employed a non-equivalent pre-test post-test parallel group design with a waitlist control. Primary school girls in the age range 6 to 12, studying in primary schools of Kerala constitute the population of the study. The participants were three intact classes of sixth grade girls (n = 97; mean age = 12.7) selected from St. Thomas HSS, Thiroor (Thrissur district). A standard measuring tape and weighing machine were used for taking physical measurements needed for the estimation of BMI. Lesson transcripts based on yogic exercise method and physical exercise method developed by the investigator were also used for pedagogic intervention. The selected classes were randomly assigned to control group and two experimental groups, viz., the Yogic Exercise Group (YEG) and the Physical Experimental Group (PEG). The pre-test BMI of the participants in the control group and experimental groups were ascertained by measuring their height and weight. This is followed by 30-days pedagogic interventions (at the rate of 30 minutes a day), spread over 46-days, were given to the experimental groups with the help of Lesson Transcripts based on Yogic Exercise and Physical Exercise (Sreejith, 2021). The pedagogic intervention for YEG consisted of 15 different 'asanas' while the intervention for the PEG consisted of different types of jogging, stretching exercises, free hand exercises, and recreational games. The post-test of BMI was done in control group and experimental groups on the 47<sup>th</sup> day of intervention by measuring their height and weight. Apart from descriptive statistics, one-way ANOVA, paired sample t-test and independent sample t-test were used for data analysis.

## **MAJOR FINDINGS OF THE STUDY**

- 1) No significant difference exists among the control group, yogic exercise group and physical exercise group with respect to the pre-test BMI scores ( $F = 1.207$ ;  $p > .05$ ).
- 2) Significant difference was noticed between pre-test and post-test scores of BMI of yogic exercise group ( $t = 5.04$ ;  $p < .01$ ). The mean score of post-test BMI was lower than that of pre-test BMI.
- 3) Significant difference was also noticed physical exercise group with respect to the pre-test and post-test scores of BMI ( $t = 3.84$ ;  $p < .01$ ). The post-test mean score of BMI was lesser than the pre-test scores of BMI.

- 4) No significant difference was found in the pre-test and post-test scores of BMI of control group ( $t = 0.81$ ;  $p > .05$ ).
- 5) Comparison of the gain scores (difference between pre-test and post-test scores) brought out significant difference between yogic exercise and physical exercise ( $t = 2.10$ ;  $p < .05$ ), the difference was in favour of yogic exercise.

## CONCLUSIONS AND SUGGESTION

The results show that girls in both yogic exercise group and physical exercise group attained significant reduction in body mass index, demonstrating the effectiveness of both yogic exercise and physical exercise in controlling BMI of elementary school girls. The result of the gain score analysis exposes that yogic exercise is better than physical exercise for controlling obesity of elementary school girls. In the light of the present study, educational agencies should introduce physical exercise or yogic exercise in schools for controlling obesity among students. Yoga should find its place in curriculum as a compulsory practical course in the core curriculum at different levels, especially at elementary school level.

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iteration, the output is compared with the anticipated results. Subsequently, accuracy is assessed and the hyperparameters are adjusted (if needed). This process is repetitive and involves either manual contribution or usage of optimization techniques available (which are beneficial when data volumes are significant in size) [3]. The success of the algorithm is directly correlated to the hyperparameter provided. At its initial stage, the model is at its early stage. An optimization algorithm is used continually to refine the design until it cannot be improved further or if the budgeted cost or time has reached. The results of the model are to be analyzed and assured for suitability for usage in the final application.

### **3.1 Merits and challenges faced using Optimization in ML algorithms**

The optimization process grants a logical and structured course of action. If all the steps are followed with utmost precision, the optimization algorithms can curtail the human-error changes that occur in design. Presentment in engineering oftentimes is misleading; hence such techniques are used as blueprints where they're written only once and applied again to other problems. When it comes to traditional engineering techniques, these are seldom calibrated by humans in maximum three dimensions. On the other hand, contemporary optimization techniques can be adjusted to problems with millions of constraints and variables.

Nevertheless, there are certain barriers faced when using optimization for design. Naturally, computational resources and time are finite, hence the algorithms provided should be selective when it comes to exploring the design space. By and large, the optimization algorithms are restricted by the designer's knowledge to detail the problem statement. There are a few cases where the optimization algorithm may benefit from providing a solution or modeling errors that are not sufficient to solve the main problem [4]. It becomes challenging to interpret when an algorithm deems to be optimal but is counterintuitive. Also, it is impeding to find the right solution when numerous optimization algorithms are not guaranteed to create superlative designs [5].

Note: The list of algorithms presented does not cover entire techniques used for differentiable and non-differentiable objective function optimization but considers the main methods utilized by practitioners.

### **3.2 Classification of Optimization Techniques**

As stated, optimization is expressed as the design point that maximizes or minimizes a well-

defined objective function. By determining how exactly a value changes as input varies is beneficial since it points to the direction that improves on previous points. The rate of change in the value of the function is measured using the derivative in one-dimension and gradient using multiple dimensions.

As a note, the most widely used type of optimization problems are continuous function optimization, wherein input arguments that are fed into a function are real-valued numeric data. The output obtained from it is also a real-valued numeric estimation. This criterion differentiates itself from functions that accept discrete variables and are defined as combinatorial optimization problems.

Hence, it is assumed that the major segregation of optimization techniques situates on whether the objective function defined can be differentiated or not; i.e., the first derivative - gradient or slope can be calculated for a nominated solution. Thus, the primary (and popular) techniques will be analyzed based on differentiable and non-differentiable functions; i.e., classical optimization techniques that use derivative data and others that do not [6].

### **3.3 Algorithms under a Differentiable Objective Function:**

- Bracketing algorithms
- Local Descent algorithms
- First-order methods
- Second-order methods

Algorithms under a non-differentiable objective function:

- Direct methods
- Stochastic methods
- Population methods

## **3.4 DIFFERENTIABLE OBJECTIVE FUNCTION GROUP**

### **3.4.1 Bracketing algorithms**

#### **Background**

Bracketing is the process of finding an interval in which the local minima lies and thereby reducing the interval without error. Derivative data is helpful when it comes to searching for an optima value(s) but there are cases where this data may not be accessible or exist. To optimize a function defined, 'bracket' an interval that carries a local minimum. Then,



reduce the size of the restricted interval to meet at the local minimum.

### Techniques used Fibonacci search

A crucial issue recurring in economics, engineering and statistics is to find the maximum of a function. When a function has one stationary point (maximum), and depends only on one variable within a finite interval, the decided method to find the maximum is built on Fibonacci numbers. This method is now known as the Fibonacci search.

Based on a limit that restricts the number of times the objective function can be queried, this technique guarantees to shrink the bracketed interval at its maximum point successfully. It is an effective (and efficient) interval search technique. The time complexity of this algorithm is  $O(\log n)$  i.e. logarithmic [7].

The sequence of Fibonacci numbers  $\{F_n\}$  is defined by

$$F_n = F_{n-1} + F_{n-2}, \quad n \geq 2, \quad F_0 = 0, F_1 = 1. \quad (1.1)$$

The sequence of Lucas numbers  $\{L_n\}$  is defined by

$$L_n = L_{n-1} + L_{n-2}, \quad n \geq 2, \quad L_0 = 2, \quad L_1 = 1. \quad (1.2)$$

The Binet's formula for Fibonacci sequence is given by

$$F_n = \frac{\alpha^n - \beta^n}{\alpha - \beta} = \frac{1}{\sqrt{5}} \left\{ \left( \frac{1+\sqrt{5}}{2} \right)^n - \left( \frac{1-\sqrt{5}}{2} \right)^n \right\} \quad (1.3)$$

where  $\alpha = \frac{1+\sqrt{5}}{2} = \text{Golden ratio} \approx 1.618$

and  $\beta = \frac{1-\sqrt{5}}{2} \approx -0.618$ .

Similarly, the Binet's formula for Lucas sequence is given by

$$L_n = \alpha^n + \beta^n = \left\{ \left( \frac{1+\sqrt{5}}{2} \right)^n + \left( \frac{1-\sqrt{5}}{2} \right)^n \right\} \quad (1.4)$$

**Fig. 3:** Fibonacci numbers sequence

### Golden Section Search

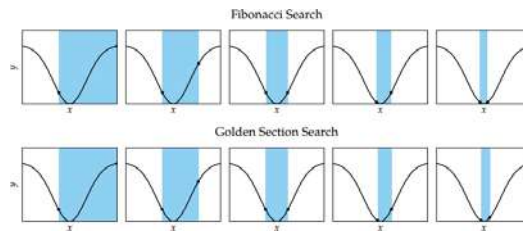
Identifies the extremum (minimum or maximum) of a single-variable function of a bracketed interval. This method narrows down to a range of values in the specified interval; hence it is a slow method yet a robust one. If the limit for large  $n$  is considered, the ratio between successive values of the Fibonacci sequence reaches the golden ratio equation [8]; therefore, this technique uses the golden ratio to estimate the Fibonacci search:

**Fig.4:** Golden ratio formulae

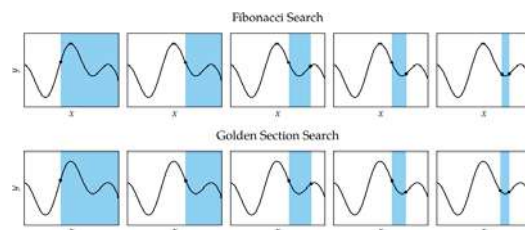
$$\lim_{n \rightarrow \infty} \frac{F_n}{F_{n-1}} = \varphi.$$

Visual comparisons between the Golden section search and Fibonacci search can be

highlighted below:



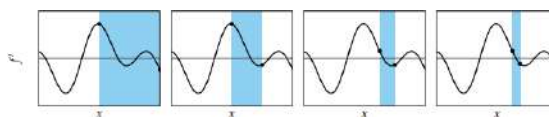
**Fig. 5:** Fibonacci vs. Golden section search on a unimodal function



**Fig. 6:** Fibonacci vs. Golden section search on a non-unimodal function

### Bisection method

A convergence method that is used to obtain the roots (real roots) of a function, or identifies where the function is zero. Once applied to the derivative of the objective, this method assists in optimization since it constantly divides the interval and picks an interval where the root of the non-linear equation is found. This method is also known as the Half-interval, Bonzano, or Binary search method [9].



**Fig. 7:** Half-interval search

### Bisection method algorithm

For any continuous function  $f(x)$ :

- Search for two points:  $x$  and  $y$  such that  $x < y$  and  $f(x) * f(y) < 0$
- Identify the midpoint 'm' of  $x$  and  $y$

- $m$  is the root of the continuous function is  $f(m) = 0$ ; else proceed to the next step
- Split the interval  $[a, b]$
- If  $f(m) * f(x) < 0$ , a root exists between  $m$  and  $x$
- Else if  $f(m) * f(b) < 0$ , a root exists between  $m$  and  $y$
- Repeat above steps until  $f(m) = 0$

### 3.4.2 Local Descent algorithms

#### Background

So far, optimization has been obtained by including a single design variable. Local descent, however, covers multivariate functions, or functions with more than a single variable. It also includes a unimodal objective function where a single global optima is found. Local (separate) models are introduced to tweak the design point incrementally until a confluence criterion is achieved. Methods under this category begin with a descent direction built on top of a local model and then selecting a step size. Eventually, the step is reduced to be within a certain region where the local model is expected to be valid.

#### Techniques used

##### Line search

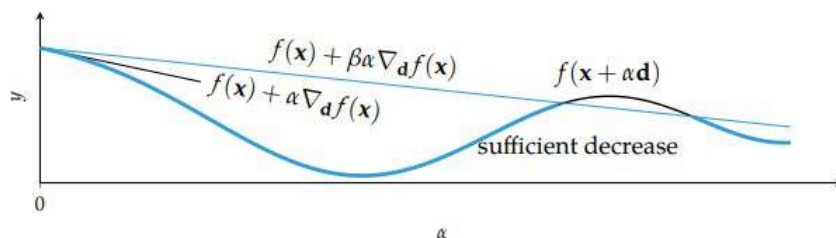
It describes a univariate optimization problem that branches into multiple forms that are applied to achieve output. The Brent-Dekker method, for example, is a popular univariate optimization problem. It blends the bisection methods capabilities with the speed of the secant method. The strategy generally includes selecting a direction to shift in the search space, then conducting a bracketing type search in a hyperplane of the selected direction. Moreover, there is a limitation identified wherein at each step, a computational expense is incurred to obtain maximum degree of precision for each directional shift. Therefore, it is usual to instantly pick a value and then move on - perhaps to a new direction. This procedure is repeated until there are no improvements to be made [10].

##### Approximate Line search

Performing additional iterations of a descent method is proved to be calculatively efficient in contrast to each iteration in exact line search, particularly if the function and derivative computations are costly. A majority of the techniques discussed so far can be gained from utilizing approximate line search to identify a fitted step size with a minor amount of evaluations. As descent methods should drop, a step size  $\alpha$  maybe appropriate if it generates

a fall in the objective function value. Nonetheless, a plethora of other factors may be integrated to allow quicker convergence.

The condition for adequate decrease needs the step size to decline gradually in the objective function value:



**Fig. 8:** Role of step-size in objective function value

With  $\beta \in [0, 1]$  often set to  $\beta = 1 \times 10^{-4}$ . If  $\beta = 0$ , then any decline in value is considered. If  $\beta = 1$ , then the decrease needs to minimum as much as what would be estimated by a first-order approximation [11].

### 3.4.1 First order methods

#### Background

These methods are designed to establish the minimum point by relying on gradient information which directs and minimizes the search space effectively. Generally, the procedure computes the gradient of the function. The pointers are then set off to traverse the gradient in the opposite direction using a step size called the learning rate. As studied, the learning rate is a hyperparameter that manages the distance to traverse in the search space. Contrary to local descent methods, these algorithms do not conduct a complete line search for each directional shift. It is crucial to understand that a small step size results in a time-consuming search and will hinder the computation process. However, a large step size will miss out on finding the optima completely due to uncontrolled bounce actions within the search space [12].

The hyperparameters can also be addressed as: Gradient descent, Momentum, Adagrad, RMSProp, and Adam algorithms. Using these could assist in improving the overall performance of the network. In fact, an optimizer parameter decides the distinction between an algorithm that converges or explodes [13]. As far as the scope of the paper is concerned, only Gradient Descent and Momentum have been described to illustrate how the optima is

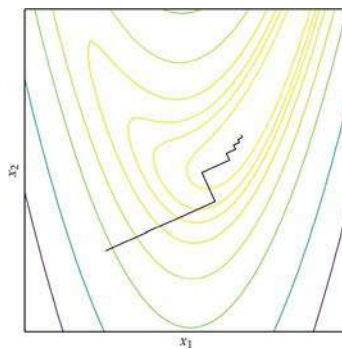
achieved.

### Techniques used Gradient Descent

Selecting the deepest descent is a learned choice for descent direction  $d$ . By following the almost perpendicular descent direction, the algorithm deduces improvement if and only if: the objective function is smooth; the step-size is small to a sufficient extent but not to the point where the gradient is zero (stationary point) [14]. The direction of the deepest descent faces opposite the gradient  $\nabla f$ , hence the name gradient descent. It can be defined as:

$$\mathbf{g}^{(k)} = \nabla f(\mathbf{x}^{(k)})$$

**Fig. 9:** Gradient descent formulae (where  $\mathbf{x}^{(k)}$  is the point at descent iteration  $k$ )



**Fig. 10:** Gradient descent movement in design space Gradient descent can lead to bounce in narrow canyons as shown in Fig. 10.

### Momentum

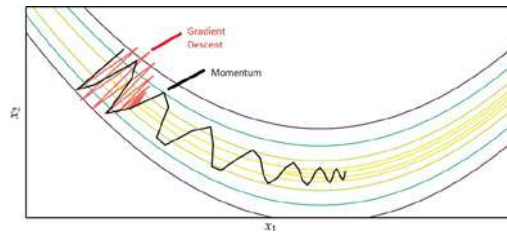
The drawback with Gradient Descent is that it consumes time for an indefinite period to traverse an approximate smooth surface. Integrating momentum as an accumulation acts as one of the ways to speed up progress. To modify gradient descent, adapt the equations below for momentum:

$$\begin{aligned}\mathbf{v}^{(k+1)} &= \beta \mathbf{v}^{(k)} - \alpha \mathbf{g}^{(k)} \\ \mathbf{x}^{(k+1)} &= \mathbf{x}^{(k)} + \mathbf{v}^{(k+1)}\end{aligned}$$

**Fig. 11:** Equations for momentum adaptation in Gradient Descent

For  $\beta = 0$ , the gradient descent is recovered. Momentum can be illustrated as a ball rolling

down an incline of a horizontal alignment. Furthermore, the ball accumulates momentum naturally since gravitation produces acceleration [15].



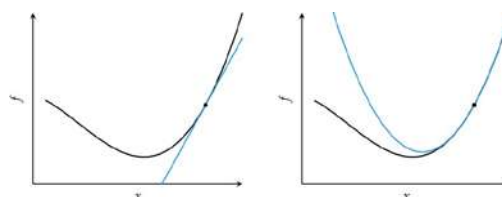
**Fig. 12:** Momentum flow in design space

### 3.4.2 Second order methods

#### Background

While the first-order methods focus on using the gradient to attain approximations of the objective function, the second-order approximations are leveraged wherein the Hessian (second derivative in univariate optimization) is utilized in multivariate optimization to lead the search. By using such approximations, it helps in informing path selection decisions and step lengths via local models in descent algorithms. Typically, the algorithms mentioned are suitable for those objective function(s) where the Hessian matrix can be computed.

Quadratic approximations have valley-shaped contours that form a single location(s) where there is a zero derivative [16].



**Fig. 13:** The difference between first-order and second-order approximations. Curve-shaped quadratic approximations have distinct positions where the derivative is zero.

#### Techniques used

##### Newton's method

Identifying a design point function value and gradient aids in determining the direction to search; however, this first-order data does not establish the distance to how far to step to so

that it reaches a local minimum. On the other hand, second-order information enables the objective function to find a quadratic approximation. This supports estimations of the right step size to attain a local minimum. It is analytically proved to derive a location where the quadratic approximation has a zero gradient, hence establishing it as the next iteration to reach a local minimum [17].

Moreover, in univariate optimization, a point  $x^{(k)}$  originates from second-order Taylor expansion:

$$q(x) = f(x^{(k)}) + (x - x^{(k)})f'(x^{(k)}) + \frac{(x - x^{(k)})^2}{2}f''(x^{(k)})$$

**Fig. 14:** The second-order Taylor expansion formulae

The new rule in Newton's method involves splitting the second derivative. The improved version is undefined if the second derivative leads to zero, which comes about when the quadratic approximation is on a horizontal line. The algorithm turns unreliable when the second derivative is near to zero. If so, the following iterate will be situated far from the current design point. Having poor approximations leads to poor performance with Newton's method [18].

### Secant method

Newton's technique for univariate function diminution entails the first and second derivative  $f$  and  $f'$ . Most of the time, the first order derivative  $f'$  is realized and not the second derivative. The Secant method depends on the Newton method using approximations of the second derivative, hence only requiring the first order derivative  $f'$ . Moreover, this trait enables the secant method to be suitable for practical application. To approximate the second order derivative, the method uses the last two iteratives:

$$x^{(k+1)} \leftarrow x^{(k)} - \frac{x^{(k)} - x^{(k-1)}}{f'(x^{(k)}) - f'(x^{(k-1)})} f'(x^{(k)})$$

**Fig. 15:** Formulae for approximation of second-order derivative using last two iteratives This estimate is then replaced into the Newton's method:

$$f''(x^{(k)}) \approx \frac{f'(x^{(k)}) - f'(x^{(k-1)})}{x^{(k)} - x^{(k-1)}}$$

**Fig. 16:** The formulae to substitute into Newton's method

The method faces challenges since it requires an extra initial design point. It endures the same drawbacks as the Newton method and may need extra iterations to reduce due to estimating the second derivative[19].

### Quasi-Newton methods

These are second order methods that integrate multivariate objective functions and estimate the inverse Hessian. The Quasi-Newton methods have the form:

$$\mathbf{x}^{(k+1)} \leftarrow \mathbf{x}^{(k)} - \alpha^{(k)} \mathbf{Q}^{(k)} \mathbf{g}^{(k)}$$

**Fig. 17:** The foundation of Quasi-Newton methods

where  $\alpha^{(k)}$  is recognized as a scalar step factor and  $\mathbf{Q}^{(k)}$  finds the inverse of the Hessian at  $x^{(k)}$ .

Under this category, there are multiple methods available such as the:

- Broyden-Fletcher-Goldfarb-Shanno (BFGS)
- Davidson-Fletcher-Powell
- Limited-memory BFGS (L-BFGS)

where the approximation to the Hessian matrix of the loss function is improved at each iteration [20].

### 3.1 Non-differentiable objective function group

Algorithms that utilize the gradient of objective function(s) are efficient and quick to execute. Nonetheless, there are algorithms where the derivative cannot be computed since the function could be complex to play out in the real world. A few challenges faced when using classical algorithms for objective functions as described above are:



- Multimodal or multiple global optima found
- Areas with invalid solutions; leads to discontinuous objective functions
- Simulation only, hence no analytical explanation of the function is found.
- Noisy algorithms - stochastic function evaluation

The following can be grouped as follows:

- Direct methods
- Stochastic methods
- Population methods

### 3.5.1 Direct methods

#### Background

These methods only depend on the objective function  $f()$ . They are referred to as black-box, zero-order, derivative-free, or pattern search methods. In addition, they do not require derivative data to steer them toward a local minima or find the point where they have obtained a local minimum. In fact, they utilize other conditions to select the next search direction and decide when they have to be converged [21].

#### Techniques used

##### Cyclic coordinate search

This method can be addressed as taxicab search or coordinate descent. As it performs a line search, it alternates between coordinate directions. The search begins from an initial  $\mathbf{x}^1$  and adjust the first input:

$$\mathbf{x}^{(3)} = \arg \min_{x_2} f(x_1^{(2)}, x_2, x_3^{(2)}, \dots, x_n^{(2)})$$

**Fig. 18:** The initial search formulae to adjust input Once the input is solved, it begins to adjust the next coordinate:

$$\mathbf{x}^{(2)} = \arg \min_{x_1} f(x_1, x_2^{(1)}, x_3^{(1)}, \dots, x_n^{(1)})$$

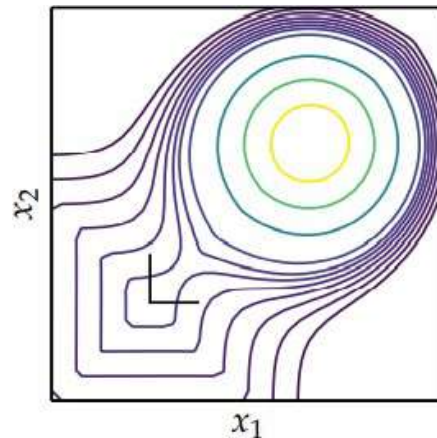
**Fig. 19:** Formulae adjusted for accepting next coordinate

This process resembles performing a sequence of line searches on a set of n-basis vectors,

where the  $i$ th basis vector consists of zero except for the  $i$ th iterative which has a value of 1.

The cyclic coordinate search seldom gets stuck. It shifts in either of the coordinate directions will result only in elevating  $f()$ . However, traversing diagonally, which is prohibited in cyclic coordinate search, can lead to lowering of  $f()$  [22].

Thus, indicating that this technique can fail to identify a local minima. This is illustrated in Fig. 20:

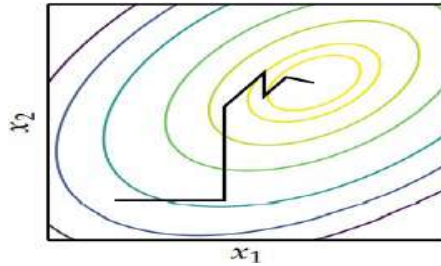


**Fig. 20:** Failure to find a local minima in Cyclic coordinate search

Similar to steepest descent, the cyclic coordinate search is set to either enhance or remain the same with each iteration. Despite a complete cycle over all coordinates, there could be no sign of improvement that shows the method has converged.

### **Powell's method**

Powell's method was initially introduced by M.J.D Powell wherein it researches an efficient method on searching the minima of a function of multiple variables without computing derivatives [23]. This method traverses in directions that are not intersecting with each other. Compared to cyclic coordinate descent or other techniques that utilize search in axis-aligned directions with a significant number of iterations, this method can self-adjust for long, narrow pathways.



**Fig. 21:** Powell's method illustration

Powell's method begins at the same point as the cyclic coordinate descent but learns to make conjugate directions at each iteration.

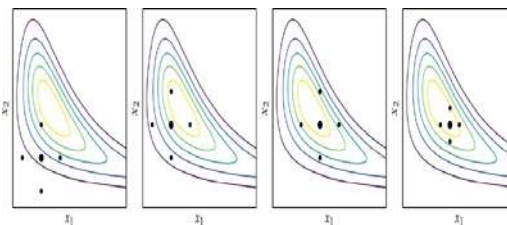
Once the oldest search direction is dropped, it begins to find the overall direction of progress, which enables the search directions to be linearly dependent. Moreover, having search factors that are not linearly independent, the directions are not capable of covering design spaces in its entirety, and hence lead to not finding the minimum.

Nevertheless, this drawback can be reduced regularly by recalibrating search pathways to basis vectors. One suggestion is to reset the direction to every  $n$  or  $n + 1$  iterations [24].

### Hook-Jeeves method

The technique passes the search space based on assessment at minor steps in each coordinate direction. With every iteration, the method assesses  $f(x)$  and  $f(x \pm \alpha e^{(i)})$  for a provided step size  $\alpha$  in all coordinate direction(s) from a point  $x$  [25]. Furthermore, it receives any advancement it can find. If no improvements are seen, then it will reduce the step size. This process iteratively repeats until the step size is small.

A part of the method needs  $2n$  function evaluations for an  $n$ -dimensional problem, which can be costly for problems with a lot of dimensions. Due to this, the algorithm is vulnerable to local minima. The technique has proved to converge on distinct function classes [26].



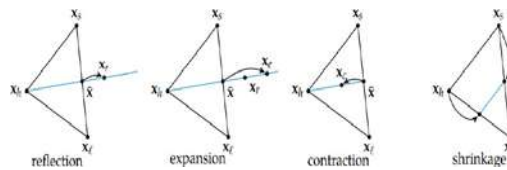
**Fig. 22:** Hook-Jeeves method illustration

From the above example, the method proceeds left to right. It starts with a sizable step size

but later shrinks it once it cannot find improvements in any coordinate direction [27].

### Nelder-Mead Simplex Method

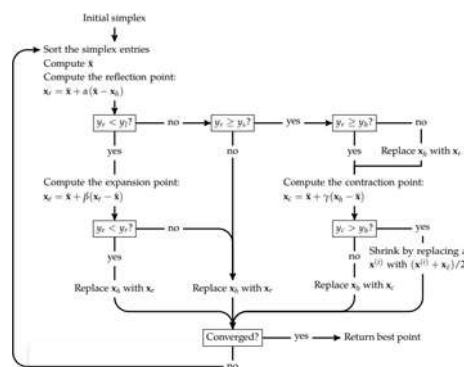
The method integrates simplex to move through the search space to find a minimum. A simplex can be defined as a tetrahedron generalization to an n-dimensional space. A simplex in one dimension is a line, and a triangle in two dimensions. It derives its name from the fact that it is an uncomplicated polytype in any provided search space.



**Fig. 23:** Visual of the simplex operations in two-dimensions.

Moreover, it embeds a series of rules to dictate how simplex is enhanced based on evaluations of the objective function at its nodes. Similar to the Hooke-Jeeves method, the simplex can traverse around while approximately continuing its size [28]. It reduces the size once it reaches an optimal value. A flowchart below states the process for better comprehensibility.

The method's convergence occurrence is different compared to Powell's method wherein it focuses fluctuations in function values rather than considering the changes to points in the search space.



**Fig. 24:** Flowchart of Nelder-Mead procedure



## **ANALYSIS OF OPTIMIZATION TECHNIQUES IN MACHINE LEARNING ALGORITHMS**

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### **ABSTRACT**

#### **PURPOSE**

The primary intent of machine learning is to employ algorithms and data to mimic human learning potential, hence steadily reducing its learning curve and adopting accuracy. Moreover, it is no longer an abstract form or methodology - but a driving technology that powers applications and industries in the real world. Examples include image and speech recognition, traffic prediction, virtual personal assistance, customer service, self-driving cars, stock market trading, and the pharmaceuticals industry. Under machine learning, a multiplicity of algorithms are embedded to solve problems. However, these algorithms are designed to operate manually, hence opening up the thought of whether such algorithms can be learned. The highlights will affirm a brief background of various optimization techniques utilized along with their applications and challenges.

#### **APPROACH**

The research was conducted based on secondary data available for evaluating optimization techniques and their founding principles.

#### **Keywords**

Optimization techniques, Machine Learning, Machine Learning algorithms, Classification of differentiable and non-differentiable objective functions

## **1. INTRODUCTION**

Over a few decades, there has been an exponential rise in processing power and storage capacities leading to the revolution in Big Data to cultivate and analyze real-time information and make qualitative decisions. With such technological advances, revolutionary products adopted machine learning as a means to predict the accurate possibility of a future action based on past event data [1]. Currently, optimization is embedded onto ML and leverages it to result close to, if not, exact predictions using computing platforms. Companies such as Salesforce, IBM, Google, Intel, and even Twitter have benefitted from integrating machine learning techniques into their business models to grow their user base and potentially understand what the consumers want and predict their next queries or actions. These techniques have paved the way to solve complex business and even societal problems to a certain extent which are seen predominantly over the past decade - effectively implemented in both first-world and third-world countries. However, to achieve explicit accuracy and avoid small errors in dynamic real-time situations, optimization is key. The chief focus is to highlight the optimization sphere and discuss its further potential to predict foreseeable and unforeseeable (important) events.

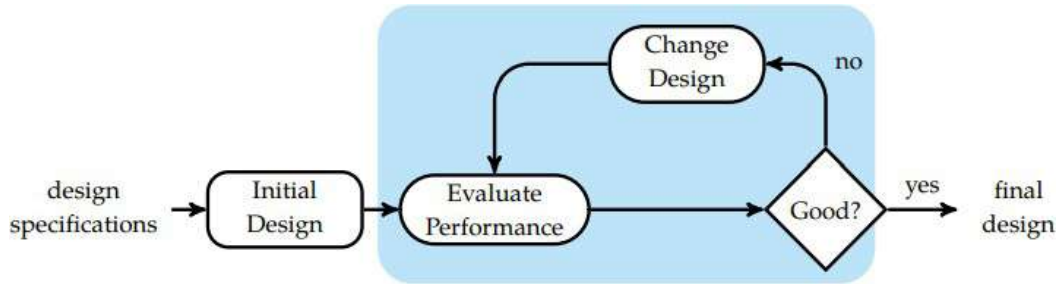
## **2. OBJECTIVES**

This research paper analyzes copious data available on optimization techniques built on top of machine learning algorithms. The objectives are:

1. To discuss optimization and its pivotal role in ML algorithms.
2. To state merits and challenges faced when using optimization in ML algorithms.
3. To elucidate optimization classification.
4. To discuss optimization techniques used in ML algorithms, their mathematical foundations, and challenges.

## **3. DEFINITION**

A simple yet common engineering design optimization process is shown in the figure below. The designer's task is to state a problem specification that provides data such as the: constraints, constants, objectives, and parameters that are to be accomplished. The designer is responsible for constructing the problem and quantifying the advantages of prospective designs. Once the designer creates an initial design, it should point towards the optimization algorithm [2].



**Fig. 1:** The design improvement process. Area in blue denotes potential automation in the optimization process.

Furthermore, it can be defined as the process of calibrating hyperparameters in order to reduce the cost function by using any of the optimization techniques available. It is essential to scale down the cost function since it expounds the deviation between the estimated parameters, the true value and what the model has predicted. Ultimately, these ‘optimizers’ change neural network attributes to minimize potential losses. The goal is to find the global minima of a function, but if minima occur, then the gradient of the function is zero. However, a zero-gradient does not imply optimality.

To move further, it is vital to grasp the subtle differences between parameters and hyperparameters of a model:

- Hyperparameters are set up before a model gets trained. They vary from learning rate, number of clusters, weights, and more. Overall, they describe the model's framework.
- Parameters, on the other hand, are produced during training. They are not obtainable beforehand. Examples can include biases and weights for neural networks. The data is restricted internally to the ML models and is altered based on the inputs provided.



**Fig. 2:** Hyperparameters in training model

To adjust the model, hyperparameter optimization is utilized. Reduction of errors with a highly accurate model is present if the nonpareil combination of values is found. After each

### 3.5.1 Stochastic methods

#### Background

Randomization is key to strategically aid in exploring the search space for an optimum when using stochastic methods. Using randomness assists in escaping local optima and enhances the probability of finding a global optima. To ensure repeatability, these methods use pseudo-random number generators. However, do note that such generators produce random numbers based on a deterministic process.

Facing a substantial amount of randomness is usually ineffective since it prevents prior evaluation points to assist in leading the search efficiently. The methods under this category are capable of controlling the degree of randomness in search [29].

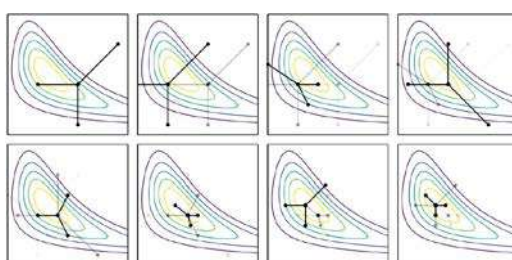
#### Techniques used Simulated Annealing

Metallurgy is the cornerstone inspiration for this method. Annealing can be described as a process when

a material is heated and then cooled hence making it easy to work with. When turned hot, the atoms in the material are flexible to move around with random motion leading to better position settlement. An unhurried cooling action transforms the material into an ordered, crystalline state. On the other hand, a quick instant quenching results in defects due to the material being forced to adjust in its contemporary condition.

Temperature is the quantity that controls the stochasticity degree during a randomized search. To elucidate, the temperature begins high, and allows the process to move around freely the search space

with the aim that in this phase, it will identify an optimal region with the ideal local minima [30].



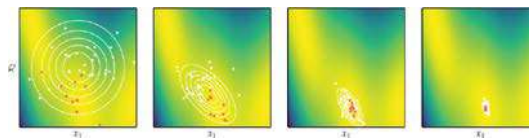
**Fig. 25:** Mesh adaptive direct search starting from left to right, top to bottom.



The method terminates when the temperature declines low enough such that the improvement is out of the picture. Termination happens when the latest function value is not far from  $q$  from prior  $n_0$  iterations and the optimal function value is gained over the execution journey.

### Cross-entropy method

The method, known as the proposal distribution, stands separately from other methods discussed so far since it regulates an explicit probability distribution over the search space. The method is based on the process of minimizing cross-entropy by fitting the distribution and is also known as the Kullback–Leibler divergence. Using certain conditions, reducing the cross-entropy leads to searching for the maximum chance of the distribution parameters. In addition, it offers new samples for the following iteration(s). With each iteration, the sample is provided from each proposal distribution which then is updated to fit a collection of ideal samples. The objective of convergence is for proposal distribution to focus on global optimum value [31].



**Fig. 26:** The cross-entropy method with  $m = 40$  experimented to the Branin function (2-dimensional function) implementing a bivariate Gaussian proposal distribution. The 10 supreme samples for each iteration are highlighted in red.

### Natural Evolution Strategies

Similar to the cross-entropy method, these techniques adjust a  $\theta$ -parameter proposal distribution. It is important to detail the proposal distribution and the sample quantity. Rather than fitting optimized samples, these strategies integrate gradient descent [32]. The gradient can be approximated from the samples through the equation:

$$\begin{aligned}
 \nabla_{\theta} \mathbb{E}_{\mathbf{x} \sim p(\cdot | \theta)} [f(\mathbf{x})] &= \int \nabla_{\theta} p(\mathbf{x} | \theta) f(\mathbf{x}) d\mathbf{x} \\
 &= \int \frac{p(\mathbf{x} | \theta)}{p(\mathbf{x} | \theta)} \nabla_{\theta} p(\mathbf{x} | \theta) f(\mathbf{x}) d\mathbf{x} \\
 &= \int p(\mathbf{x} | \theta) \nabla_{\theta} \log p(\mathbf{x} | \theta) f(\mathbf{x}) d\mathbf{x} \\
 &= \mathbb{E}_{\mathbf{x} \sim p(\cdot | \theta)} [f(\mathbf{x}) \nabla_{\theta} \log p(\mathbf{x} | \theta)] \\
 &\approx \frac{1}{m} \sum_{i=1}^m f(\mathbf{x}^{(i)}) \nabla_{\theta} \log p(\mathbf{x}^{(i)} | \theta)
 \end{aligned}$$

**Fig. 27:** The gradient approximation formulae

### 3.5.2 Population Algorithms

#### Background

Previous sections discussed so far have a single design point that is shifted incrementally en route for a minimum. Population methods consist of optimization via ‘individuals’ - group of design points. When a substantial number of individuals are distributed throughout the search space, it allows the algorithm to prevent being stuck at a local minimum.

Data at spread out points in the search space can be allocated between individuals to optimize the objective function globally. A majority of these methods are stochastic in nature, and it is usually simple to embed parallel computations [33]. It starts off with initialization wherein the methods are introduced with an initial population - similar to how descent methods expect an initial design point. The initial population must propagate to maximize the changes for samples to be near the best regions.

#### Techniques used Genetic algorithms

The methods obtain inspiration from biological evolution, where deemed-fit individuals are probable to spread their genes to the next generation. In fact, an individual’s fitness level for reproduction is inversely proportional to the value of the objective function at a specified point.

The design point connected to an individual is addressed as a chromosome. Every single generation of fitter individuals’ chromosomes are passed to the subsequent generation after undertaking the crossover, genetic operations, and mutations [34].

#### Chromosomes

There are multiple ways to represent chromosomes. The easiest method is to integrate a binary string chromosome - a representation that is alike to how DNA is encoded.



**Fig. 28:** A chromosome representation using a binary string.

Binary strings are commonly used since they allow expressing crossover at ease along with mutation. Still, the decoding process of a binary string and generating a design point is not guaranteed to be smooth. Oftentimes, the binary string may not associate a valid point in the search space. It is natural to showcase a chromosome using a list of real values. These chromosome values are vectors  $R^d$  that are directly proportional to points in the search space.

## Initialization

The algorithms begin with a randomized initial population. Binary string chromosomes are usually triggered using random bit strings.

## Selection

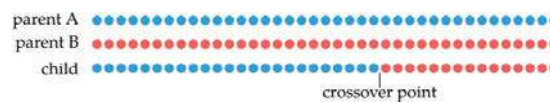
Selection is the process of picking chromosomes to identify as parents for the upcoming generation. A population with  $m$  chromosomes will have a selection method that generates an  $m$ -parental pairs list for  $m$  children of the following generation. Do note that the selected pairs may contain duplicates.

## Crossover

Crossover joins the parents' chromosomes to produce children. There are a few crossover schemes:

- **Single-point crossover**

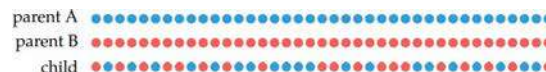
The initial portion of parent A's chromosomes generates the initial portion of the child chromosome, and the latter part of parent B's chromosomes creates the latter part of the child chromosome. The intersected point where the transition happens is fixed uniformly at random.



**Fig. 29:** Single-point crossover

- **Two-point crossover**

Two crossover points are used



**Fig.30 :** Two-point crossover

The aforementioned crossover methods are applicable for real-valued chromosomes. There are definition schemes to allow additional crossover regimes that interpolate between real

values.

The real values are interpolated in a linear fashion between the matured individual values  $x_a$  and  $x_b$ :

$$\mathbf{x} \leftarrow (1 - \lambda)\mathbf{x}_a + \lambda\mathbf{x}_b$$

**Fig. 31:** Real value interpolation between distinct values

where  $\lambda$  is a scalar condition usually assigned to one-half.

### **Mutation**

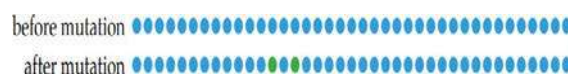
If the latest chromosomes were created only via crossover, many characteristics not available in the random initial population would never happen, and the elite-fit genes could overly spread the population. Mutation, however, enables new traits to voluntarily form thus allowing the genetic method to discover extra state space. Additionally, child chromosomes go through mutation after crossover. Each binary-valued chromosome bit comprises a minor probability of being reversed. For example, a chromosome with  $m$ -bits will have a mutation rate of  $1/m$  hence causing an average of a single mutation for each child chromosome. Real-valued chromosomes' mutations can be executed using bitwise flips; nevertheless, it is usual to include zero-mean Gaussian noise too.

### **Differential Evolution**

Differential evolution method tries to upgrade each individual in the population by readjusting and combining other individuals within the sample based on a straightforward formula:

It requires a parameter of a differential weight  $w$  and a crossover probability [35]. Usually,  $w$  is between

0.4 and 1. For each  $x$ :

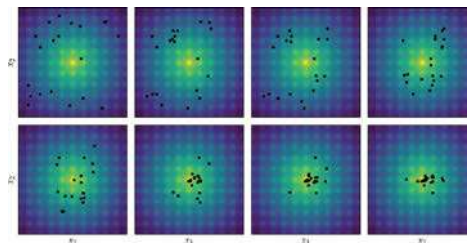


**Fig. 32:** Representation of binary string before and after mutation application

- Select three random unique individuals a, b, and c
- Create an interim design  $z = a + w \cdot (b - c)$
- Enable optimization by opting for a random dimension  $j \in [1, \dots, n]$  in n dimensions
- Design the distinct candidate individual  $x'$  via binary crossover

$$x'_i = \begin{cases} z_i & \text{if } i = j \text{ or with probability } p \\ x_i & \text{otherwise} \end{cases}$$

- Place the optimized design between  $x$  and  $x'$  into the upcoming generation



**Fig. 33:** Demonstration of differential evolution with  $p=0.5$  and  $w=0.2$  applied to Ackley's function - *a function that is used to test a method's probability of being stuck in local minima. It consists of two main components - an exponential bell curve fixed at the center of the origin and a sinusoidal component that creates a collection of local minima which institutes the global minimum of a function.*

### Particle Swarm Optimization

Particle Swarm Optimization initiates momentum to obtain minima by accelerating convergence. Each particle (individual) in the population sample maintains a track of its present velocity, position, and the ideal position it's viewed from so far. Momentum also enables an individual to gather speed in a beneficial direction that is distinct from local deviations.

Within each iteration, every individual moves towards both the ideal position it has seen and the optimum position found compared to any other individual thus far [36]. The accelerated movement is weighted by a random parameter with distinct random numbers being yielded for each acceleration. The updated equations are shown as: where  $x_{best}$  is the greatest location identified so far compared to other particles;  $r_1$  and  $r_2$  are random numbers drawn from  $U(0,$

1) which is a popular strategy that accepts inertia  $w$  to fester over time;  $w$ ,  $c_1$ , and  $c_2$  are parameters [37].

## 1. CONCLUSION

As machine learning is integrated into a variety of applications and industries, its learning ability takes a steep curve; however, with introduction to optimization of such algorithms, the methods themselves begin to learn and embed the best parameters to achieve the optimum value to make decisions and solve problems.

Each of the methods share a common trait that helps segregate and identify the best algorithm needed for a given problem. Moreover, they do not define a one-size-fits-all solution. With this idea, the paper analyzes:

- Optimization algorithms that can be identified into those that require derivatives and those that execute without.
- Classical methods implement the first and oftentimes the second derivative of the objective function.
- Stochastic and direct search algorithms are constructed as objective functions where function derivatives are absent.
- Overall review of algorithms utilized to showcase utility presence in a practical environment

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**A COMPREHENSIVE ANALYSIS OF NONDIFFERENTIABLE  
OPTIMIZATION METHODS IN MACHINE LEARNING  
ALGORITHMS**

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**ABSTRACT**

Machine learning's main goal is to use algorithms and data to simulate human learning ability, gradually lowering its learning curve and achieving accuracy. Additionally, it is a driving technology that underpins real-world applications and industries rather than an abstract form or approach. Examples include traffic analysis, virtual personal help, customer service, self-driving automobiles, stock market trading, and the pharmaceutical sector. A variety of algorithms are included into machine learning to solve difficulties. These algorithms are created to be used manually, raising the question of whether they can be taught. The highlights will confirm a brief history of the many optimization strategies used, as well as their uses and difficulties. The study was based on secondary data that may be used to assess optimization strategies used for non-differentiable objective functions and their

guiding ideas.

## **Keywords**

**Optimization techniques, Machine Learning, Machine Learning algorithms, Classification of non-differentiable objective functions**

## **1. INTRODUCTION**

The development of real-time information and its analysis in order to make quality decisions has been enabled by the exponential increase in processing power and storage capabilities over the past few decades. With such technical advancements, novel goods used machine learning as a way to accurately anticipate the likelihood of a future action based on data from previous occurrence. [1]. Currently, optimization is combined with ML and uses computer platforms to produce predictions that are near to, if not exact. Businesses like Salesforce, IBM, Google, Intel, and even Twitter have benefited from incorporating machine learning techniques into their business models in order to increase their user base, understand what the customers want, and possibly forecast their upcoming searches or actions. These methods, which have been successfully used in both first-world and third-world countries over the past 10 years, have opened the path to solving complicated corporate and, to some extent, societal problems. However, optimization is essential to attain explicit correctness and prevent minor inaccuracies in dynamic real-time scenarios. The main goal is to draw attention to the optimization field and to talk about how it might be used to predict future significant occurrences, both foreseeable and unexpected.

## **2. OBJECTIVES**

This research paper analyzes copious data available on optimization techniques built on top of machine learning algorithms. The objectives are:

1. To elucidate optimization classification.
2. To discuss optimization techniques used in ML algorithms, their mathematical foundations, and challenges.

### 3. DEFINITION

In a simple yet common engineering design optimization process, It is the responsibility of the designer to present a problem specification that includes information such as the requirements, constants, goals, and parameters that must be met. The designer is in charge of formulating the issue and calculating the benefits of potential solutions. The original design produced by the designer should be oriented toward the optimization algorithm [2]. In addition, it is the process of calibrating hyper parameters to lower the cost function using any of the available optimization approaches. Scaling down the cost function is crucial because it highlights the discrepancy between the estimated parameters, the true value, and what the model predicted. These "optimizers" ultimately alter neural network properties to reduce possible losses. The objective is to locate a function's global minima, but if one is reached, the function's gradient is zero. Zero gradient does not, however, guarantee optimality. Understanding the minute variations between a model's parameters and hyper parameters is essential to moving forward.

- Before a model is trained, hyper parameters are set. They differ in terms of learning rate, cluster size, weights, and other factors. They describe the overall structure of the model.
- On the other hand, parameters are created during training. They cannot be obtained in advance. Biases and weights for neural networks are two examples. The data is only accessible internally by the ML models, and it is modified according to the inputs given.

Hyper parameter optimization is used to modify the model. The presence of a reduction in errors with a highly accurate model indicates the discovery of the nonpareil set of values. The output is compared with the predicted outcomes following each iteration. The hyper parameters are then changed once accuracy is evaluated (if needed). This repeated procedure involves either manual input or the use of existing optimization techniques (which are beneficial when data volumes are significant in size) [3]. The specified hyper parameter has a direct impact on how well the algorithm performs. The model is in its early stages at this point. The design is continuously refined using an optimization algorithm until there is no more room for improvement or the budgeted cost or time has passed. The model's output must be evaluated in order to confirm its acceptability for use in the intended

application.

#### **4. MERITS AND CHALLENGES FACED USING OPTIMIZATION IN ML ALGORITHMS**

The process of optimization provides a clear and organized line of action. The optimization algorithms can reduce design changes brought on by human mistake if every step is carried out precisely. Engineering presentation is frequently misleading, thus these methods are utilized as blueprints, created only once and then applied again to different issues. Traditional engineering methods are typically calibrated by people in a maximum of three dimensions. Modern optimization methods, on the other hand, can be modified to solve issues with millions of constraints and variables. However, there are some difficulties when employing optimization for design. Because computing time and resources are limited by their very nature, the algorithms offered should be judicious in how they explore the design space. In general, the designer's ability to precisely define the problem statement limits the optimization algorithms. In a few circumstances, the optimization method may profit from offering a solution or correcting modelling mistakes that are insufficient to address the core issue [4]. When an algorithm produces results that seem to be optimal but actually make no sense, it becomes difficult to understand. Additionally, the fact that many optimization techniques do not guarantee the creation of excellent designs makes it difficult to select the best solution [5].

#### **5. CLASSIFICATION OF OPTIMIZATION TECHNIQUES**

As stated, optimization is expressed as the design point that maximizes or minimizes a well-defined objective function. By determining how exactly a value changes as input varies is beneficial since it points to the direction that improves on previous points. The rate of change in the value of the function is measured using the derivative in one-dimension and gradient using multiple dimensions. As a note, the most widely used type of optimization problems are continuous function optimization, wherein input arguments that are fed into a function are real-valued numeric data. The output obtained from it is also a real-valued numeric estimation. This criterion differentiates itself from functions that accept discrete variables and are defined as combinatorial optimization problems. Hence, it is assumed that the major segregation of optimization techniques situates on whether the objective function defined can be differentiated or not; i.e., the first derivative - gradient or slope can be

calculated for a nominated solution. Thus, the primary (and popular) techniques will be analyzed based on differentiable and non-differentiable functions; i.e., classical optimization techniques that use derivative data and others that do not [6].

### **5.1 Algorithms under a non-differentiable objective function:**

- Direct methods
- Stochastic methods
- Population methods

#### **Non-differentiable objective function group**

Algorithms that utilize the gradient of objective function(s) are efficient and quick to execute. Nonetheless, there are algorithms where the derivative cannot be computed since the function could be complex to play out in the real world. A few challenges faced when using classical algorithms for objective functions as described above are:

- Multimodal or multiple global optima found
- Areas with invalid solutions; leads to discontinuous objective functions
- Simulation only, hence no analytical explanation of the function is found.
- Noisy algorithms - stochastic function evaluation

#### **5.1.1. Direct methods**

##### **Background**

These methods only depend on the objective function  $f()$ . They are referred to as black-box, zero-order, derivative-free, or pattern search methods. In addition, they do not require derivative data to steer them toward a local minima or find the point where they have obtained a local minimum. In fact, they utilize other conditions to select the next search direction and decide when they have to be converged [21].

## Techniques used

### i) Cyclic coordinate search

This method can be addressed as taxicab search or coordinate descent. As it performs a line search, it alternates between coordinate directions. The search begins from an initial

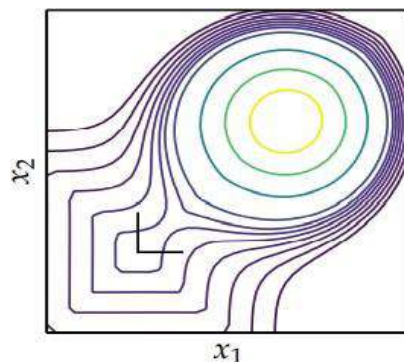
$$\mathbf{x}^{(3)} = \arg \min_{x_2} f(x_1^{(2)}, x_2, x_3^{(2)}, \dots, x_n^{(2)})$$

$x_1$  and adjust the first input. The initial search formulae to adjust input is as follows:

Once the input is solved, it begins to adjust the next coordinate using

$$\mathbf{x}^{(2)} = \arg \min_{x_1} f(x_1, x_2^{(1)}, x_3^{(1)}, \dots, x_n^{(1)})$$

This process resembles performing a sequence of line searches on a set of n-basis vectors, where the  $i^{\text{th}}$  basis vector consists of zero except for the  $i^{\text{th}}$  iterative which has a value of



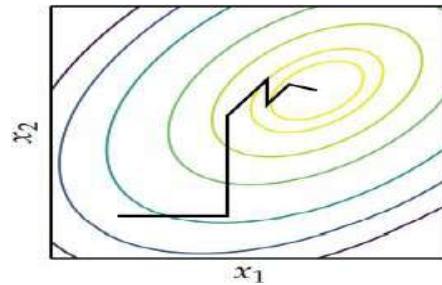
1. The cyclic coordinate search seldom gets stuck. It shifts in either of the coordinate directions will result only in elevating  $f()$ . However, traversing diagonally, which is prohibited in cyclic coordinate search, can lead to lowering of  $f()$  [22]. Thus, indicating that this technique can fail to identify a local minima. This is illustrated in Fig. 1:

**Fig. 1:** Failure to find a local minima in Cyclic coordinate search

Similar to steepest descent, the cyclic coordinate search is set to either enhance or remain the same with each iteration. Despite a complete cycle over all coordinates, there could be no sign of improvement that shows the method has converged.

## ii) Powell's method

Powell's method was initially introduced by M.J.D Powell wherein it researches an efficient method on searching the minima of a function of multiple variables without computing derivatives [23]. This method traverses in directions that are not intersecting with each



other. Compared to cyclic coordinate descent or other techniques that utilize search in axis-aligned directions with a significant number of iterations, this method can self-adjust for long, narrow pathways.

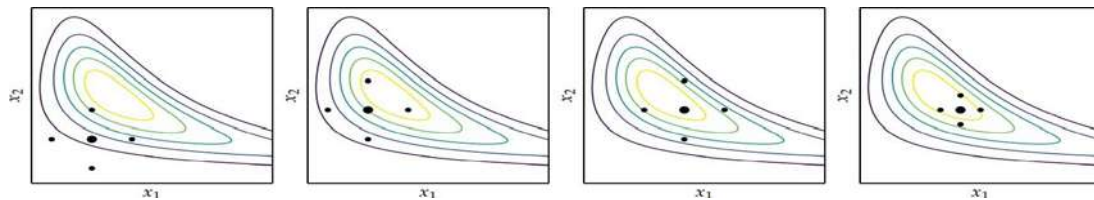
**Fig. 2:** Powell's method illustration

Powell's method begins at the same point as the cyclic coordinate descent but learns to make conjugate directions at each iteration. Once the oldest search direction is dropped, it begins to find the overall direction of progress, which enables the search directions to be linearly dependent. Moreover, having search factors that are not linearly independent, the directions are not capable of covering design spaces in its entirety, and hence lead to not finding the minimum. Nevertheless, this drawback can be reduced regularly by recalibrating search pathways to basis vectors. One suggestion is to reset the direction to every  $n$  or  $n + 1$  iterations [24].



### iii) Hook-Jeeves method

The technique passes the search space based on assessment at minor steps in each coordinate direction. With every iteration, the method assesses  $f(x)$  and  $f(x \pm \alpha e^{(i)})$  for a provided step size  $\alpha$  in all coordinate direction(s) from a point  $x$  [25]. Furthermore, it receives any advancement it can find. If no improvements are seen, then it will reduce the step size. This process iteratively repeats until the step size is small. A part of the method needs  $2n$  function evaluations for an  $n$ -dimensional problem, which can be costly for problems with a lot of dimensions. Due to this, the algorithm is vulnerable to local minima. The technique has proved to converge on distinct function classes [26].



**Fig. 3:** Hook-Jeeves method illustration

From the above example, the method proceeds left to right. It starts with a sizable step size but later shrinks it once it cannot find improvements in any coordinate direction [27].

### iv) Nelder-Mead Simplex Method

The method integrates simplex to move through the search space to find a minimum. A simplex can be defined as a tetrahedron generalization to an  $n$ -dimensional space. A simplex in one dimension is a line, and a triangle in two dimensions. It derives its name from the fact that it is an uncomplicated polytype in any provided search space. Moreover, it embeds a series of rules to dictate how simplex is enhanced based on evaluations of the objective function at its nodes. Similar to the Hooke-Jeeves method, the simplex can traverse around while approximately continuing its size [28]. It reduces the size once it reaches an optimal value.

## 5.1.2 Stochastic methods

### Background

Randomization is key to strategically aid in exploring the search space for an optimum when using stochastic methods. Using randomness assists in escaping local optima and enhances the probability of finding a global optima. To ensure repeatability, these methods use pseudo-random number generators. However, do note that such generators produce random numbers based on a deterministic process. Facing a substantial amount of randomness is usually ineffective since it prevents prior evaluation points to assist in leading the search efficiently. The methods under this category are capable of controlling the degree of randomness in search [29].

### Techniques

#### used

#### Simulated

##### i) Annealing

Metallurgy is the cornerstone inspiration for this method. Annealing can be described as a process when a material is heated and then cooled hence making it easy to work with. When turned hot, the atoms in the material are flexible to move around with random motion leading to better position settlement. An unhurried cooling action transforms the material into an ordered, crystalline state. On the other hand, a quick instant quenching results in defects due to the material being forced to adjust in its contemporary condition. Temperature is the quantity that controls the stochasticity degree during a randomized search. To elucidate, the temperature begins high, and allows the process to move around freely the search space with the aim that in this phase, it will identify an optimal region with the ideal local minima [30]. The method terminates when the temperature declines low enough such that the improvement is out of the picture. Termination happens when the latest function value is not far from  $q$  from prior no iterations and the optimal function value is gained over the execution journey.

##### ii) Cross-entropy method

The method, known as the proposal distribution, stands separately from other methods discussed so far since it regulates an explicit probability distribution over the search space.

The method is based on the process of minimizing cross-entropy by fitting the distribution and is also known as the Kullback–Leibler divergence. Using certain conditions, reducing the cross-entropy leads to searching for the maximum chance of the distribution parameters. In addition, it offers new samples for the following iteration(s). With each iteration, the sample is provided from each proposal distribution which then is updated to fit a collection of ideal samples. The objective of convergence is for proposal distribution to focus on global optimum value [31].

## ii) Natural evolution strategies

Similar to the cross-entropy method, these techniques adjust a  $\theta$ -parameter proposal distribution. It is important to detail the proposal distribution and the sample quantity.

$$\begin{aligned}
 \nabla_{\theta} \mathbb{E}_{\mathbf{x} \sim p(\cdot|\theta)}[f(\mathbf{x})] &= \int \nabla_{\theta} p(\mathbf{x} | \theta) f(\mathbf{x}) d\mathbf{x} \\
 &= \int \frac{p(\mathbf{x} | \theta)}{p(\mathbf{x} | \theta)} \nabla_{\theta} p(\mathbf{x} | \theta) f(\mathbf{x}) d\mathbf{x} \\
 &= \int p(\mathbf{x} | \theta) \nabla_{\theta} \log p(\mathbf{x} | \theta) f(\mathbf{x}) d\mathbf{x} \\
 &= \mathbb{E}_{\mathbf{x} \sim p(\cdot|\theta)}[f(\mathbf{x}) \nabla_{\theta} \log p(\mathbf{x} | \theta)] \\
 &\approx \frac{1}{m} \sum_{i=1}^m f(\mathbf{x}^{(i)}) \nabla_{\theta} \log p(\mathbf{x}^{(i)} | \theta)
 \end{aligned}$$

Rather than fitting optimized samples, these strategies integrate gradient descent [32]. The gradient can be approximated from the samples through the equation:

### 5.1.3 Population algorithms

#### Background

Previous sections discussed so far have a single design point that is shifted incrementally en route for a minimum. Population methods consist of optimization via ‘individuals’ - group of design points. When a substantial number of individuals are distributed throughout the search space, it allows the algorithm to prevent being stuck at a local minimum. Data at spread out points in the search space can be allocated between individuals to optimize the objective function globally. A majority of these methods are stochastic in nature, and it is usually simple to embed parallel computations [33]. It starts off with initialization wherein the methods are introduced with an initial population - similar to how descent methods expect an initial design point. The initial population must propagate to maximize the changes for samples to be near the best regions.

## **Techniques used**

### **A. Genetic**

The methods obtain inspiration from biological evolution, where deemed-fit individuals are probable to spread their genes to the next generation. In fact, an individual's fitness level for reproduction is inversely proportional to the value of the objective function at a specified point. The design point connected to an individual is addressed as a chromosome. Every single generation of fitter individuals' chromosomes are passed to the subsequent generation after undertaking the crossover, genetic operations, and mutations [34].

### **B. Chromosomes**

There are multiple ways to represent chromosomes. The easiest method is to integrate a binary string chromosome - a representation that is alike to how DNA is encoded. Binary strings are commonly used since they allow expressing crossover at ease along with mutation. Still, the decoding process of a binary string and generating a design point is not guaranteed to be smooth. Oftentimes, the binary string may not associate a valid point in the search space. It is natural to showcase a chromosome using a list of real values. These chromosome values are vectors  $R^d$  that are directly proportional to points in the search space.

### **Initialization**

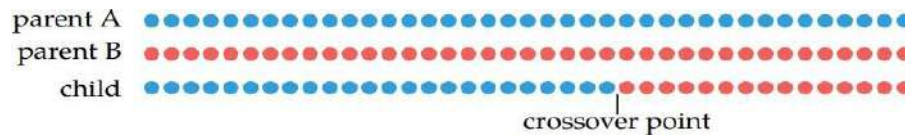
The algorithms begin with a randomized initial population. Binary string chromosomes are usually triggered using random bit strings.

### **Selection**

Selection is the process of picking chromosomes to identify as parents for the upcoming generation. A population with  $m$  chromosomes will have a selection method that generates an  $m$ -parental pairs list for  $m$  children of the following generation. Do note that the selected pairs may contain duplicates. Crossover ,Crossover joins the parents' chromosomes to produce children. There are a few crossover schemes:

- **Single-point crossover**

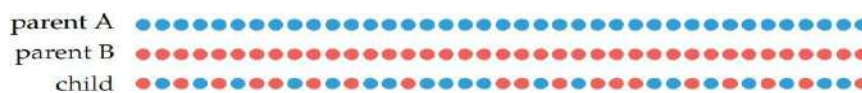
The initial portion of parent A's chromosomes generates the initial portion of the child chromosome, and the latter part of parent B's chromosomes creates the



latter part of the child chromosome. The intersected point where the transition happens is fixed uniformly at random.

**Fig.4:** Single-point crossover

- **Two-point crossover**



Two crossover points are used

**Fig.5 :** Two-point crossover

The aforementioned crossover methods are applicable for real-valued chromosomes. There are definition schemes to allow additional crossover regimes that interpolate between real values.

The real values are interpolated in a linear fashion between the matured individual values  $x_a$

$$\mathbf{x} \leftarrow (1 - \lambda)\mathbf{x}_a + \lambda\mathbf{x}_b$$

and  $x_b$ . The real value interpolation between distinct values is find using the following equation.

where  $\lambda$  is a scalar condition usually assigned to one-half.

## Mutation

If the latest chromosomes were created only via crossover, many characteristics not available in the random initial population would never happen, and the elite-fit genes could overly spread the population. Mutation, however, enables new traits to voluntarily form thus

allowing the genetic method to discover extra state space. Additionally, child chromosomes go through mutation after crossover. Each binary-valued chromosome bit comprises a minor probability of being reversed. For example, a chromosome with  $m$ -bits will have a mutation rate of  $1/m$  hence causing an average of a single mutation for each child chromosome. Real-valued chromosomes' mutations can be executed using bitwise flips; nevertheless, it is usual to include zero-mean Gaussian noise too.

### Differential evolution

Differential evolution method tries to upgrade each individual in the population by readjusting and combining other individuals within the sample based on a straightforward formula:

It requires a parameter of a differential weight  $w$  and a crossover probability [35]. Usually,  $w$  is between and 1. For each  $x$ :

- Select three random unique individuals  $a$ ,  $b$ , and  $c$
- Create an interim design  $z = a + w \cdot (b - c)$
- Enable optimization by opting for a random dimension  $j \in [1, \dots, n]$  in  $n$  dimensions

$$x'_i = \begin{cases} z_i & \text{if } i = j \text{ or with probability } p \\ x_i & \text{otherwise} \end{cases}$$

- Design the distinct candidate individual  $x'$  via binary crossover
- Place the optimized design between  $x$  and  $x'$  into the upcoming generation

### Particle Swarm Optimization

Particle Swarm Optimization initiates momentum to obtain minima by accelerating convergence. Each particle (individual) in the population sample maintains a track of its present velocity, position, and the ideal position it's viewed from so far. Momentum also enables an individual to gather speed in a beneficial direction that is distinct from local

$$\begin{aligned} x^{(i)} &\leftarrow x^{(i)} + v^{(i)} \\ v^{(i)} &\leftarrow wv^{(i)} + c_1r_1(x_{\text{best}}^{(i)} - x^{(i)}) + c_2r_2(x_{\text{best}} - x^{(i)}) \end{aligned}$$

deviations. Within each iteration, every individual moves towards both the ideal position it has seen and the optimum position found compared to any other individual thus far [36]. The accelerated movement is weighted by a random parameter with distinct random numbers being yielded for each acceleration. The updated equations are shown as:

where  $x_{best}$  is the greatest location identified so far compared to other particles;  $r1$  and  $r2$  are random numbers drawn from  $U(0, 1)$  which is a popular strategy that accepts inertia  $w$  to fester over time;  $w$ ,  $c1$ , and  $c2$  are parameters [37].

## 6. CONCLUSION

Machine learning has a steep learning curve as it is integrated into a range of applications and industries, but when these algorithms are optimised, the methods themselves start to learn and incorporate the optimal parameters to get the best value when making decisions and solving problems. Each approach has a characteristic in common that aids in sorting and locating the ideal algorithm for a particular problem. Additionally, they don't specify a universally applicable remedy. The study examines optimization algorithms that can be divided into those that operate without derivatives and those that do so. In the absence of function derivatives, the stochastic and direct search algorithms are built as objective functions. Review of all algorithms used to demonstrate utility present in a real-world setting.

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**POST PERFORMNCE EVALUATION OF IPO'S IN INDIAN  
FINANCIAL MARKET– AN EMPIRICAL ANALYSIS OF  
SELECTED FIRMS**

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**ABSTRACT**

Initial Public Offering is the most important method to raise fund by the business, big companies with good reputation offer their shares to the public This study focused on IPO Performance Analysis by analysing the Listing-day return and the Post performance of IPO in the Indian financial Market. Issue price, listing day gain or loss, post – issue performance of the IPO for firms listed from 2017 to 2021 has been taken for the study. The study also analysing the under-pricing and over-pricing of the IPOs and the changes in the performance of the IPOs after the listing. It is observed that the IPO have massive success in the listing day and the performance of the IPO starts diminishing due to various reasons.

**Keywords**

**IPO, Post performance, Book Building .**

## INTRODUCTION

There are several factors which affects the performance of IPO. The public market opens up a huge opportunity for millions of investors to buy shares in the company and contributes capital to a company's shareholder's equity. Every investors who invest their money with the ultimate aim of getting high returns. They invest money only after considering several factors. Such factors are closely watched by the investors. Some IPO's may be overly hyped by the investment bankers which may lead to initial losses.

The following are some of the factors which are closely watched by the investors:

- **Lock – UP:** Lock – Up is a kind of agreements having legal binding contract between the underwriter and the company, prohibiting them selling any shares for a specified period. The period can range anywhere from 3 to 24 months.
- **Waiting Periods:** Some investment banks include waiting periods in their offering terms. This criteria helps the investors to purchase shares of some companies after a specific period. Under this method, the price may increase if this allocation is bought by the underwriters and decreases if not.
- **Flipping:** It is the method of reselling an IPO stock in the first few days to earn a quick profit. It is common when the stocks are discounted and soars on its first day of trade.

It has been found that investors who purchase IPOs on the offering day earn high returns on the first trading day. This indicates that these shares could have been priced at the of their offering to the public at the value which is lower than their intrinsic value. This phenomenon is called Under-pricing.

The under-pricing of the issue represents the first day return generated by the firm and is calculated as:

$$\frac{\text{Closing Price} - \text{Offer Price}}{\text{Offer Price}}$$

In addition to this, an issue is said to be over-priced if the price received by the issuer in the primary market is higher than the price of the same security in the secondary market.

In a nut shell,

**Under-Pricing:** If the offer price is less than (<) the first day trading price.

**Fairly Priced:** If the offer price is same (=) as the first day trading price.

**Over-Pricing:** If the offer price is greater than (>) the first day trading price.

This study focused on identifying the listing day gains, post return gains and underpricing or overpricing of the IPO'S in Indian financial market.

## REVIEW OF LITERATURE

**Securities and Exchange Board of India (SEBI)**, In Indian Capital Market, corporates raise capital through issue of shares by IPO, Right issue or Private Placement. IPO is the process of first issue of shares of a listed company. IPOs can be made through the following methods i.e, fixed price method, book building method or a combination of both. **BSE India**, the most common process that companies usually use for issuing shares is the process of book building. Book building is one process used by companies for IPO and FPO to raise capital. It is a mechanism where, the bids are collected from investors at various prices, which are within the price band specified by the issues. The issue is determined based on the demand generated in the process after the bid closure. **Pichler and Stomper (2004)** in their study concluded that Primary Market is enlarged day by day and is providing various investment avenues to publics at large and the transparent mechanism of investment is provided to the public which led to better control and overall supervision. **Arwah Arjun Madan (2003)**, in his article 'Investments in IPOs in the Indian Capital Market', published in Bimaquest stated that IPOs registered a drastic fall in the return in the long run (Five – Years after listing).

**Anand Adhikari (2010)**, in his article "New Listings – Pied Pipers of Primary Market" demonstrated that companies with unique business models got listed in the year 2009-2010 made the investors rich. **Ajay Yadhav, Sweta Goel (2019)** stated that there are several ways to raise capital from primary market. Out of those Initial Public Offerings are the widely used tool by the companies to raise funds from open market operations by the

companies. **Aloysius Edward J (2019)** analyzed that capital market promotes economic growth of a country through promoting savings and increases productivity. One of the major reforms is the IPOs in primary market. It is said that IPOs emerged as one of the foremost sources of funds for Indian companies, Book building and Fixed price issue are two widely used methods for IPO's.

**Ashish Kumar Suri and Bhupendra Hada (2018)** in their research stated that they considered 107 IPOs launched during the period 2011 to 2017 on the basis of performance indicators i.e, over-subscription and listing day gains. The study aims at comparing the performance of IPOs for two periods January 2011 to May 2017 and June 2014 to June 2017. The outcome of the study was that the performance of IPO's launched during the period January 2011 to May 2014 significantly differs from the performance of the IPO's which were launched between June 2014 to June 2017. **Garima Baluja, Balwinder Singh (2016)** in their paper stated IPO market recorded vast fluctuations after the introduction of SEBI in 1992. Several new issues have entered the market during this period and only few have managed to survive well in the market.

**S. Poornima, Aalaa.J.Haji,(2016)** stated that IPO's are gaining importance worldwide as an important source of raising funds by the companies. It helps the companies to accelerate their growth by using the mobilized funds to implement innovative strategies as well as important innovative strategies as well as important tool for investment since it offers huge profits on the listing day. **Deepa (2016)**, in her study stated that short run performance of the companies analyzed to understand the anomaly of abnormal returns and long run performance are analyzed to understand the long-term performance of the IPOs.

**Gowtham Ramkumar (2017)**, in his article "Influence of Stock Market factors on Investors Perception" concluded that factors influencing investor perception has an important impact on investment choices which can create advantage to people dealing in the stock exchanges. **Ansari Abdul Aziz and Jane Samiran (2009)**, in their article "Stock Price Decision of Indian Investors", concluded that rational traders are using both fundamental analysis and technical analysis for stock selection, which does not support the view of finance experts.

**Rajiv Bhuvra** in his article, "IPO Boom – Fever Pitch" pointed that the year 2010 was record year for IPOs because so many companies had come up with huge issue size for the

investors. **Jabel (2018)** in his study concluded that investors cannot earn abnormal returns from the post listing period of IPOs. **Ritter (1991); Jain & Kini (1999)** stated that IPO has always considered as an opportunity for short term or long-term gains. **Lewis (1993)** in his study demonstrated IPO returns in short run and long run can have either positive or negative relationship.

**Poornima (2016)** in her study demonstrated negative or least returns in short run and long run registered high return. **Durukan (2002)** observed that volume on issues on monday yields higher returns than other days issued IPO's. **Dong (2011)** observed that the underwriters play a vital role in the issue performance of IPO's i.e, Pre-Issue and Post Issue. **Upadhyay & Tripathi (2016)** reported that IPOs marketed by prestigious underwriters provide massive returns and higher after market returns. **Mehyah & Paudyal (2016)** suggested that IPOs are under-priced on the listing day but missed out the pricing phenomenon after a certain period of listing. **Omran (2005)** stated that the underpricing of business group companies was higher than that of stand-alone companies. **Jain B.A, O. Kini (1994)** pointed out that the change in operating performance of firms i.e, from private to public ownership, there is a significant decline in operating performance subsequent to the IPO is found.

**Paul.A.Gompers (1996) and Megginson and Weiss (1991)** reported IPOs are relative less underpriced which are supported by experienced and established venture capital funds. **Carter and Manster (1990)** in their study reported that IPO associated with well establish underwriters exhibit lower initial returns. **Titman and Trueman (1986)** reported that firms with good prospectus choose to bring their IPOs into market through high-quality auditors and underwriters to signal their true value. The quality of auditor and underwriters have an impact on IPO quality. **Supriya and Phani (2016)** found that ownership held by the promoters represents the quality of the firm. Since, Promoters are the people who brings a company into existence and the owners have superior information. **Aggarwal (2002)** proved that the degree of underpricing has a positive impact by percentage ownership held by the managers. **Supriya and Phani (2016)** documented that the issue size has a significant impact on the degree of underpricing of IPOs.

**Madan (2003)** found that there is a negative relationship between return on listing and issue price, issue size, age of firm and issue capital listing. **Ritter (1991)** added that investing in IPOs at the end of first day of the listing day and holding them for more than 3 years would have left the investors with small amount in addition the companies going public in heavy



volume did even worse than average. **Sohail and Raheman (2009)** states that investors, who measure their investment in IPO companies, will have returns in negative over the period of one year after listing. They will gain abnormal negative returns and their IPOs investments underperform the market over a period of one year. **Loughran and Ritter (2004)** examined that a small part of the increase in under-pricing can be attributed to the changes in risk composition of the universe of firms going public.

**Venkatesh and Neupane (2005)** in their study concluded that the underpricing of their issues made by prestigious underwriters is slightly less than those made by non-prestigious underwriters. **Madhusoodanan and Thiripalraju (1997)** in their study indicates that the underpricing in the Indian IPOs in the short run is higher than the experiences of other countries. In the long-run too, Indian offerings have given high returns compared to negative returns reported from other countries. **Krishnamurti (2002)** provides an evidence for the wide spread underpricing of Indian IPOs by analysing 386 IPOs. The evidence confirms the underpricing phenomenon in Indian Market by using Raw returns, Market Adjusted Returns.

**Singh (2003)** reported that the initial listing returns of IPOs are related to subscription levels and raw returns. Market adjusted returns are strongly related with subscription levels. Underpricing is due to the merchant bankers' inability the extent of demand for the issue at the offer price. **Vaidyanathan (2007)** studies the price performance of IPOs in the NSE. The study suggests that the demand generated for an issue during book building and the listing delay positively impact the first day underpricing. **Vikraman P and K.C John Sasi Kumar (2009)** in their article demonstrated that the fundamental risk and returns involved in the investment of IPOs and the performance of IPO. It was found that the IPOs during the short period is promising.

## **THEORETICAL FARMWORK**

### **INITIAL PUBLIC OFFERING (IPO)**

The main source of raising capital for any business house is through capital market. Capital market is considered as an important constituent in the Indian Financial System. It is a place where long term securities are bought and sold. The funds can be raised in capital market within and outside India. It helps in economic growth by channelizing the savings to proper savings. The capital market of a country is classified into two-

- ✓ Primary Market
- ✓ Secondary Market

Primary Market is a market where equity shares are offered very first time for its purchase. That means a company needs primary market for initial public offering. It is a market for fresh issue or new issue of shares. The primary market plays a vital role in the new issue of shares or bonds. It enables corporate, public-sector institutions, and government, to raise resources for meeting their capital requirements.

Initial public offering (IPO) is the common way for the firm to raise capital. In an IPO, companies offer securities to the public for subscription. In return the company gets cash proceeds from the sale of securities for meeting their operations or expanding their business. It is to be noted that, after IPO the securities will be available in the secondary market for trading in the stock exchanges.

In an IPO, the mechanism at which the price of the securities is traded will be decided on the term called book building. If there is situation of over-subscription the shares will be issued through pro-rata basis. Also, when the shares are issued to the existing shareholders of a company it is known as right issue. Another mechanism where by a company can issue shares to qualified institutional buyers (QIB) is known as qualified institutional placement. Companies hire investment banks to understand the market, gauge demand, set the IPO price and date and more. In addition, companies must meet the requirement criteria introduced by exchanges and the Securities and Exchange Commission (SEC) to hold an IPO. Also, an IPO can be used as an exit strategy for the company's founders and early investors, realizing the full profit from their private investment.

The initial public offer (IPO) is the process of offering the shares of a company to the public. When a private company wants to become public, it will offer its shares to the public. It is also considered as one of the important method raise fund by the companies for meeting the working capital requirements. Before making an IPO, a company is considered as a private entity. As a pre-IPO private company, the business has grown with a relatively small number of shareholders including its early investors like the founders, family, and friends along with professional investors such as venture capitalist or angel investors. When a company reaches maturity stage in its growth process, it will begin to advertise its interest in going public. Public market opens up a huge opportunity for millions of investors to buy

shares in the company and contribute capital to a company's shareholders equity. The public consists of any individual or institutional investors who are interested in investing in the company.

The number of shares the company sells and the price for which the shares sell are the generating factors for the company's new shareholders equity value. It provides advantages to the promoters to sell their shares and reap more return for their shares.

### **Significance and Objectives of the Study**

Return or benefits from the IPO during past two – three years was not an attractive in Indian financial market. The performance of the IPO on the listing day could be satisfactory but after the post issue the performance is not up to the expectation. Experts suggest few reasons for this situation as huge hike given to the listing, huge issue size, influence of prestigious underwriters and so on. So to know further, following objectives set for the study.

- ❖ To evaluate the performance of IPO on listing day.
- ❖ To analyse the short-term performance of top gainers from listing day returns.

### **Methodology of the Study**

Study includes all IPOs listed in Indian capital market from January 2017 to December 2021. Total of 154 IPOs are selected in the study from January 2017 to December 2021 for the calculation of listing day return. After calculating the listing day return, top 5 IPOs earned high listing day were selected from each year. Therefore, a total of 25 companies will be chosen and the short-term post IPO performance of the companies are studied.

**Data Source:** In the research study secondary data is collected with respect to different variables related to IPOs the data is collected from different valid sources mentioned below:

- Official website of NSE
- Moneycontrol.com
- Investing.com
- Official website of SEBI

**Variables Selected for the study:** In the research study, the secondary data is collected for the following financial indicators of the company

**Issue price:** The price at which a company's shares are presented or offered to market for the first time, which may be at par or at a premium or discount. In case of Book building issue process (all the IPOs considered are issued through book building in this study), the issue price is decided by the registrar after receiving all the prices mentioned on the applications for the shares which are selected from the range of prices. When they begin to be traded, the market price may be higher than or below the issue price as various market forces play the picture.

**Issue size:** The amount of capital that a company wants to raise by offering its equity shares to the public is called issue size.

**List price:** After closing of the issue the IPO lists on the stock exchange. The Market price after the listing on the stock exchange is known as the list price of the issue. The list price reflects the market expectations associated with the company performance in the future.

**Listing Day Return:** This is the return earned by the investor by selling the allotted shares on the listing day itself.

**Listing Day Close Price:** Listing Day close price is the price which is recorded in the Indices the end of the listing day. There may be open, high, low and close for the share prices.

**Current Market Price:** Market price is the price in which assets are bought and sold. The market price of an asset or services are determined on the basis of demand and supply. The current market price of a stock is the current price at which the stock is currently trading.

## **Findings**

The total number of IPO listed in the Indian Capital Market from January 2017 to December 2021 are given below. From this, it is evident that in the year 2021, 63 firms has registered the most number of IPOs in in the Indian Capital Market over the past 5 years. Among these, the least number of IPO listed is recorded in the year 2019 are 16 and 2020 are 14 respectively indicates the sluggishness in IPO except in the last year 2021.

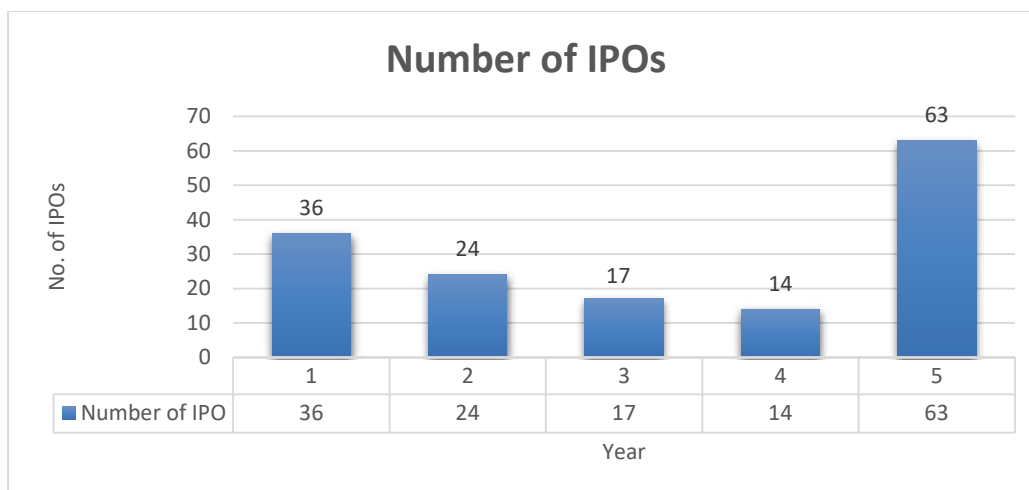


Figure 1- Number of IPO'S in Indian financial market

### Listing Day performance evaluation of IPO's in Indian financial Market

Industry wise classification of IPO companies will tell about the industrial growth & economic growth of the country. For the last 5 years, total of 154 companies IPOs were from 39 sectors have been listed. Among these 14 companies from Pharmaceutical and Speciality Chemicals sector has listed the most number of IPOs. following the 10 companies from Consulting Services sector which has been registered. The listing day return is calculated which helps to evaluate the listing day performance of the IPOs. For this, the issue price and the closing of the IPO on the listing day is considered. A total of 36 IPOs were listed in 2017 and out of it 26 companies were under-priced (i.e, offer price is less than the first day trade price). The balance 10 companies were over-priced (i.e, offer price is more than the price of the first day trade) during the year. Listing Day Return of IPOs for the year 2018. From this it is found that a total of 25 companies were listed and out of it 12 IPOs were under-priced and 12 were recorded over-priced. And 1 company has recorded fairly priced (i.e, offer price is same as the first day trading price). The IPOs of Karda Construction Ltd (-20.67%), ICICI Securities Ltd (-14.41%), IRCON International Limited (-12.28%), Garden Reach Shipbuilders & Engineers Limited (-10.93%) recorded highest listing day negative returns. In 2019, out of 16 companies listed, 12 companies IPO were under-priced on the listing day and 4 companies IPO were over-priced. IPO of IRCTC Limited gained highest return on the listing day. Year 2020 has recorded a total of 14 IPOs and 12 IPOs were under-priced and 6 IPOs were over-priced. Out of these, Mrs. Bectors Food Specialities Limited (106.79%) highest listing day return and IPOs of Equitas Small Finance Bank Ltd (-0.76%), UTI Asset Management Company Ltd (-13.97%), Angel One Ltd (-9.85%), SBI Cards and Payment

Services Ltd (-9.51%) demonstrated negative listing day returns to the investors. it was found that the year 2021 recorded the most number of IPOs after the covid effect. A total of 63 companies were listed in the year and 47 companies were under-priced on the first trading day and 16 companies were over-priced.

### Post-Performance IPO Evaluation

The study attempts to evaluate the performance of IPO after one month, three month, six month, one year and current market price from the date of issue.

### Post- Performance IPO Return

IPO NAME	ISSUE PRICE	LISTING DAY PRICE	ONE MONTH RETURN	THREE MONTH RETURN	SIX MONTH RETURN	ONE YEAR RETURN	CURRENT MARKET RETURN
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Salasar Techno Engineering Ltd	100	240	187.96	263.8	260.3	299.12	23.1
Astron Paper & Board Mill Ltd	100	239.4	281.4	213.4	226.2	225.5	75
Avenue Supermarts Limited	100	214.29	251.23	264.29	294.58	511.33	1419.34
Central Depository Services	100	175.57	250.7	229.36	240.13	182.95	756.34
Dixon Technologies (India) Limited	100	163.77	150.77	198.28	198.92	193.89	209.5

Apollo Micro Systems Limited	100	165.12	116.8	87.41	64.38	49.61	52.4
HDFC Asset Management Company Limited	100	165.01	153.25	127.53	138.08	195.38	177.2
Amber Enterprises India Limited	100	144.03	127.14	132.56	112.72	112.71	290.3
Lemon Tree Hotels Limited	100	127.85	129.28	130.08	139.19	135.08	7.67
Bandhan Bank Limited	100	127.25	135.05	139.69	187.7	127.26	73.65
IRCTC Limited	100	227.68	283.53	304.42	489.18	427.71	199.09
CSB Bank Limited	100	153.89	106.69	85.94	62.56	117.74	102.59
Ujjivan Small Finance Bank Ltd	100	151.08	141.08	104.59	72.02	83.1	51.89
India Mart Ltd	100	133.86	126.36	197.26	225.19	253.53	437.22
Neogen Chemicals Limited	100	122.58	142.51	166.83	164.16	158.67	638.81
Happiest Minds Technologies Ltd	100	223.49	196.05	195.93	212.25	828.22	583.1
Mrs. Bectors Food Specialities Limited	100	206.78	137.69	120.69	139.77	140.97	109.32
Route Mobile Ltd	100	186.02	215.05	305.64	435.8	554.45	400.17
Rossari Biotech	100	174.67	174.5	181.29	191.83	275.55	211.65

Ltd							
Chemcon Speciality Chemicals Limited	100	172	121.05	147.06	127.6	129.98	98.02
Sigachi Industries Limited	100	370.39	250.73	196.19	194.84	89.25	149.96
Paras Defence and Space Technologies	100	285	503.4	424.57	353.4	85.45	356.91
Latent View Analytics Limited	100	248.02	252.38	215.35	243.14	90.25	188.83
Tatva Chintan Pharma Chem Ltd	100	213.31	192.54	231.3	235.24	212.31	213.96
Indigo Paints Limited	100	209.3	177.21	155.4	170.75	128.46	93.4

Table 1- Firms post performance IPO return

### **Performance of IPO after three months from the date of issue**

Among 25 IPOs, all the companies have shown positive return from the date of listing. Among these IPOs, Paras Defence and Space Technologies Limited (503.4%), IRCTC Limited (283.53%), Astron Paper & Board Mill Ltd (281.4%), Latent View Analytics Limited (252.38%), Avenue Supermarts Limited (251.23%) demonstrated huge growth from the date of listing.

### **Performance of IPO after three months from the date of issue**

Among 25 IPOs, 2 IPO has demonstrated decrease in the return from the date of listing. Paras Defence and Space Technologies Limited (424.57%), Route Mobile Ltd (305.64%), Avenue Supermarts Limited (264.29%), Salasar Techno Engineering Ltd (263.8%) generated attractive positive returns. Apollo Micro Systems Limited (87.41%), CSB



Bank Limited (85.94%) have generated negative returns from the listing date.

### **Performance of IPO after six months from the date of issue**

Among 25 IPOs, 22 have shown positive returns. Out of these, IRCTC Limited (489.18%), Route Mobile Ltd (435.8%), Paras Defence and Space Technologies Limited (353.4%), Avenue Supermarts Limited (294.58%), Salasar Techno Engineering Ltd (260.3%) generated attractive returns from the date of issue. Apollo Micro Systems Limited (64.38%), CSB Bank Limited (62.56%), Ujjivan Small Finance Bank Ltd (72.02%) generated negative returns from the date of issue.

### **Performance of IPO after one year from the date of issue**

Among 25 IPOs, 20 have generated positive return and 5 IPOs have generated negative returns. Out of these Happiest Minds Technologies Ltd (828.22%), Route Mobile Ltd (554.45%), Avenue Supermarts Limited (511.33%), IRCTC Limited (427.71%), Salasar Techno Engineering Ltd (299.12%) have demonstrated growth from the date of issue. Apollo Micro Systems Limited (49.61%), Ujjivan Small Finance Bank Ltd (83.10%), Sigachi Industries Limited (89.25%), Paras Defence and Space Technologies Limited (85.45%), Latent View Analytics Limited (90.25%) demonstrated negative returns from the date of issue.

### **Current Market Price Performance**

It is found that, 17 have generated positive return in the current market scenario after the listing. Out of these Avenue Supermarts Limited (1419.34%), Central Depository Services (India) Limited (756.34%), Neogen Chemicals Limited (638.81%), Happiest Minds Technologies Ltd (583.10%), Route Mobile Ltd (400.17%) have shown positive return. Lemon Tree Hotels Limited (7.67%), Salasar Techno Engineering Ltd (23.10%), Ujjivan Small Finance Bank Ltd (51.89%), Apollo Micro Systems Limited (52.4%), Bandhan Bank Limited (73.65%) Chemcon Speciality Chemicals Limited (98.02%) demonstrated negative returns.

## Sectoral Performance of IPO'S in Indian Financial Market

SECTOR	ISSUE PRICE	ISSUE SIZE (Cr)	CURRENT MARKET PRICE	RETURN (%)
<b>1. Engineering sector</b>				
Salasar Techno Engineering Ltd	108	38.87	24.95	-76.89
<b>2. Paper Industry</b>				
Astron Paper & Board Mill Ltd	50	70	37.5	-25
<b>3. Retail sector</b>				
Avenue Supermarts Limited	299	1870	4243.85	1319.34
<b>4. Finance – Investments</b>				
Central Depository Services (India) Limited	149	523.99	1126.95	656.34
HDFC Asset Management Company Limited	1100	2800.33	1947.3	77.02
<b>5. Electricals</b>				
Dixon Technologies (India) Limited	1766	600	3699.9	109.51
<b>6. Aerospace and Defence</b>				
Apollo Micro Systems Limited	275	156	144.1	-47.6
<b>7. Miscellaneous</b>				
Amber Enterprises India	859	600	2493.7	190.3

Limited				
IRCTC Limited	320	645.12	637.1	99.09
IndiaMART InterMESH Ltd	973	475.59	4254.15	337.21
<b>8. Hotels</b>				
Lemon Tree Hotels Limited	859	1038.68	65.95	-92.32
<b>9. Banks (Private Sector)</b>				
Bandhan Bank Limited	375	4473.02	276.5	-26.35
CSB Bank Limited	195	409.68	200.05	2.58
Ujjivan Small Finance Bank Ltd	37	750	19.2	-48.1
<b>10. Chemicals</b>				
Neogen Chemicals Limited	215	132.35	1369.15	536.81
<b>11. Computers Software</b>				
Happiest Minds Technologies Ltd	166	702.02	967.95	483.1
<b>12. Consumer Food</b>				
Mrs. Bectors Food Specialities Limited	288	540.54	314.85	9.32
<b>13. IT Services and Consulting</b>				
Route Mobile Ltd	350	600	1400.6	300.17
Latent View Analytics Limited	197	600	372	88.83

<b>14. Speciality Chemicals</b>				
Rossari Biotech Ltd	425	496.49	899.55	111.65
Chemcon Speciality Chemicals Limited	340	318	333.3	-1.97
Tatva Chintan Pharma Chem Ltd	1083	500	2317.2	113.96
<b>15. Pharmaceuticals and Drugs</b>				
Sigachi Industries Limited	163	125.43	244.45	49.96
<b>16. Defense</b>				
Paras Defence and Space Technologies Limited	175	170.78	624.6	256.91
<b>17. Paint sector</b>				
Indigo Paints Limited	1490	1176	1391.7	-6.59

Table 2- Sectoral Performance of IPO in Indian financial market

It is evident that Avenue Supermarts Limited from Retail sector is providing attractive returns (1319.34%). Following that IPOs from Finance & Investment sector is also providing good returns to the investors. Central Depository Services (India) Limited (656.34%), HDFC Asset Management Company Limited (77.02%). It is also evident that the banking sector is providing negative returns. 2 out of 3 IPOs providing negative returns to the investors.

## Top Performers from IPO Segment

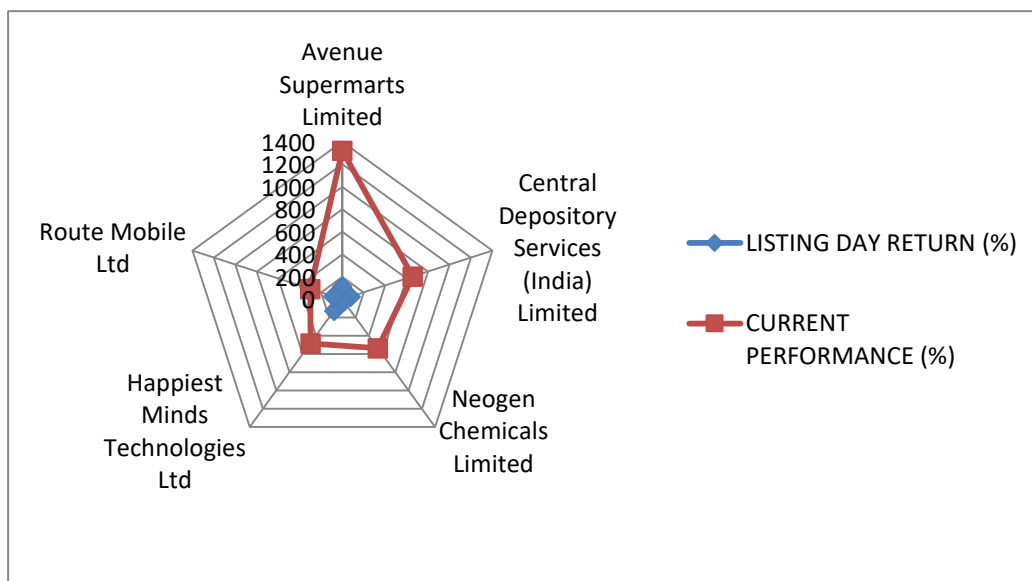


Figure 2- Top performers from IPO Segment

## CONCLUSION

From this study, it can be concluded that majority of the IPOs were providing attractive return on the listing day. The study found that IPOs under-priced are yielding higher returns to the investors. It is indicated as the closing price of the listing day is higher than the issue price on the listing day. While considering the short-term performance of the IPOs, the top gainers on the listing day finds it difficult to keep the momentum. The banking sector has been providing negative returns for the investors. After the covid pandemic, it has been found that there is an increase in the pharmaceutical and speciality chemicals sectors which also have a positive impact on the IPO return. For this study, the variables considered are: Issue price, Issue size, listing day close price, Current market return etc. and it is found that there is a significant relation between all these variables in the performance of an IPO.

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## **A SURVEY ON THE IMPACT OF CLIMATIC CHANGE ON BLUE-CHIP COMPANIES INVESTMENT IN INDIAN STOCK MARKET**

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### **ABSTRACT**

In the context of the Indian market, this study looks into any possible links between climate and market index returns of blue-chip companies. The performance of top blue-chip companies is studied to find out the whether they are affected by climatic conditions. Primary data is collected from respondents who are investors in various companies and residents of Kochi and a study about the impact of climate on the trading of blue-chip companies is made.

### **INTRODUCTION**

Today, all global business establishments are issuing environmental standards that disclose their criteria for making investment decisions knotted to environment protection and sustainability. Besides, governments around the world are developing procedures to lessen the country-level GHG emissions that directly affect the energy sector by altering technologies and policies. Climate change due to environmental problems is a comprehensive challenge of our period. The COP21 Paris Agreement in 2015 was welcomed as an aspiring goal that beckoned nations around the world as considering climate change sincerely aiming to limit the escalation of temperatures due to climate change globally. Granting the gains obtained from the production and commercialization of alternative energy, the shift away from fossil fuels which humankind needs much, will not be instant, but steps have to be made to moderate the environmental impact as much as possible. Various studies have found

climate factors such as temperature, atmospheric pressure, rain and wind speed to affect human mood. The most important factors that affect human moods are sunshine, clouds, and relative humidity (Howarth and Hoffman, 1984) which in turn have an impact on stock returns.

The phrase 'Blue Chip' was coined by Oliver Gin Gold, who worked at Dow Jones in 1923. A blue chip is a nationally documented, well-time-honoured and financially encyclopedic company which trades widely renowned high-quality products and services. Blue chip companies are identified to climate downturns and function gainfully during adverse economic conditions, which contributes to their long record of enduring persistent growth. The literature about climate and its effect on blue chips is scrutinized to find out whether the climate has any effect on the trading of blue-chip companies. From the data collected from the investors in various companies, this study is conducted about the impact of climate on blue chip companies.

### **Keywords**

**Climate; blue-chip companies, trading system, environment**

## **REVIEW OF LITERATURE**

Several findings have expounded the potential of forests to contribute to the mitigation of climate change and its adaptation. The environment may be harmed by an upsurge in the utilization of traditional and engineered wood products for construction and building. The change in climate due to environmental factors may in turn affect the blue-chip companies. Allen and Fischer (1978) investigated how sunlight affects human behaviour in decision making, Sunlight, according to Cunningham (1979), has an impact on people's emotions and moods, which can then change how they feel about a particular behaviour. According to Howarth and Hoffman (1984), high humidity levels were negatively correlated with human performance whereas sunshine hours were favourably correlated with it. Since many consumers are prepared to pay extra for environmentally friendly items, there is a chance that becoming more environmentally conscious will increase profitability (Coddington, 1990; Suchard & Polonsky, 1991). It is well established that psychological factors, such as mood, feelings, emotion, and sentiment, influence people's judgement and decision-making (Wright and Bower 1992). Saunders (1993) asserts that since the climate may affect market traders'



decisions, it should be reflected in stock returns. According to Diltz (1995), who examined the daily returns for twenty-eight common stock portfolios with strong environmental performance over the years 1981 to 1991, social screening did not significantly boost portfolio performance, but environmental performance did.

The climate effect, as described by Rind (1996), is the idea that there is a significant relationship between the climate and human mood and feeling, and ultimately, their behaviour and decision-making. Kramer and Runde (1997) replicated the conclusions of Saunders using German data and established that short-term stock returns were not disturbed by the local climate. Bagozzi et al. (1999) opined that psychological factors including feelings, moods, sentiments, and emotions significantly impact how people behave when making decisions. Kamstra et al. (2000) discovered evidence that the move from then daylight-saving time had a noteworthy and negative impact on stock prices.

According to Hirsh Leifer and Shumway (2001), the climate may affect how people trade stocks. Keef and Roush (2002) looked into how meteorological factors including wind, temperature, and cloud cover affected the returns on stocks. Nofsinger (2002) believed that people's psychological states had an impact on their decision-making behaviour. If traders can conduct business remotely from locations with a variety of climate conditions, the climate shouldn't have any effect at all on stock prices (Angel Pardo, 2003). Hirsh Leifer and Shumway (2003), pontificated that cloud cover has a detrimental impact on daily stock returns. Wind and humidity's influence on the Shanghai Composite Index were demonstrated by Yi and Wang (2005). Chang et al. (2006) expounded that temperature and cloud volume hurts Taiwanese stock market results. Keef and Roush's (2007) research showed that there is a direct association between Australian stock market temperature and return rates. Dowling and Lucey (2008) looked into the correlation between climate and stock performance using multiple climate proxy variables. Through the use of humidity, temperature, and cloud cover, Yoon and Kang's (2009) research examined the impact of climate on Korea's stock returns. The openness of the Shanghai B-stock market to domestic investors and the impact of contrasting the climate effects between the two periods before and after the opening were both taken into consideration by Kang et al. (2010). They observed that the climate has a significant impact on B-share returns only in the days following the opening, which may mean that domestic investors may be contributing to the climate effect.

Investors make investments in green businesses, ideally, non-blue-chip businesses, to get

enhanced returns with a reduced amount of risk (Vanita Tripathia, Varun Bhandarib, 2012). The climate effect, as defined by Bassi et al. (2013), is the result of the climate's major impact on people's moods and feeling on their decisions and actions. In more recent research, Novy-Marx (2014) discovered that the climate conditions caused by global warming and the El Nino phenomenon have a significant impact on predicting the performance of well-known anomalies in stock markets, suggesting that these factors have a predictable impact on asset pricing. The study by Kaplanski et.al (2015), showed that investors' expectations for returns and risk were all surveyed. People who experience seasonal affective disorder have non-economic characteristics that affect their systematic risk and return expectations and investment strategies. It is discovered that the winter blues while confirming the idea that the expected return is lowest in the fall. Schmittmann et al. (2015) investigated how the climate affected investors' trading on the German stock market and discovered convincing evidence of a link between the climate and overall trading volume. Using a cross-correlation coefficient, Cao and Han (2015) scrutinized the impact of the climate and discovered that some meteorological variables have an impact on the returns and volatility of the stock markets. The climate effects were identified by Kaustia and Rantapuska (2016), who also connected stock returns to the climate and discovered that some climate-related mood factors are individually significant. Using intraday stock data, Pizzutilo and Roncone (2017) investigated the impact of climate on the stock market and concluded that there is no consistent correlation between climate and stock returns. Dong and Tremblay (2018) investigated the relationship between climate and stock index return and discovered widespread and organized patterns of climate effects.

## **SIGNIFICANCE AND OBJECTIVES OF THE STUDY**

The excellent stock market performance, particularly that of blue chips, depends on educated choices made by stakeholders, particularly investors. This ultimately contributes to the economic growth of the country by increasing its income and marketability. The study's main goal is to raise awareness of the impact of climate change brought on by deforestation, pollution, etc., but there are also secondary goals, such as determining

- (i) To know the impact of climate change on stock market
- (ii) To know the effect of climate change on blue chip company stocks

(iii) To identify the causes of the abrupt and severe climate changes

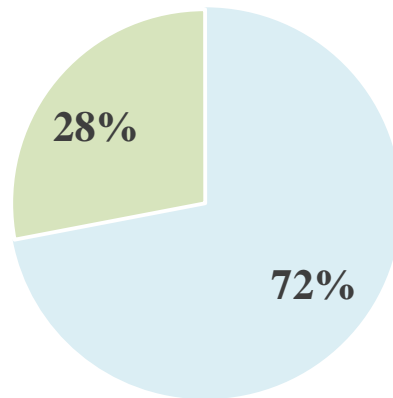
## **METHODOLOGY OF THE STUDY**

Respondents were chosen from Kochi based on sampling method whether they were stock market investors or keen observers of how the economy and financial markets are affected by climate change. The questionnaire was distributed via mail and social media, and the replies were gathered, examined, and graphically depicted. In addition, a theoretical analysis is carried out using a number of articles that produced conflicting findings. However, the majority of academics hold the view that due to climate change, investors' moods are significantly impacted on one hand by psychological factors, such as mood, feelings, emotion, and sentiment, which affect people's judgment and decision-making, and on the other hand by the environmental consciousness of businesses (Wright and Bower 1992). (Coddington, 1990; Suchard & Polonsky, 1991). The majority of businesses are being exhorted by stakeholders to become more environmentally friendly in order to lessen and adapt to climate change.

## **FINDINGS**

According to the survey, around 72% of respondents believed that climate change would have an impact on the stock market, while 28% had the opposite opinion (diagram-1). However, just 20% of respondents believed that blue-chip corporations would be impacted by climate change. Blue chip corporations may have strong cash flows, consistent earnings per share, and a consistent dividend policy, which could be the cause. Approximately 80% of respondents believed that blue-chip corporations will not be impacted by climate change(diagram-2). The majority of respondents attributed the causes of climate change, which may have an impact on the stock market and the economy, to deforestation, the burning of fossil fuels, and pollution. Additionally, they advocated for the use of geothermal, solar, and wind energy in place of fossil fuels.

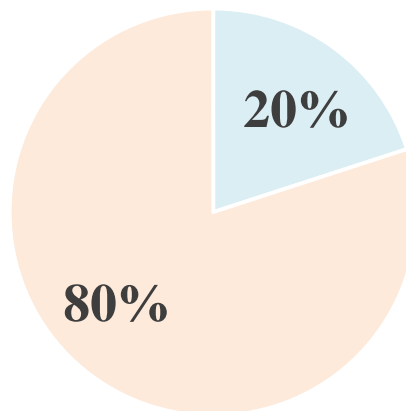
## Climate Change and Stock Markets



■ will affect stock market ■ will not affect stock market

Diagram-1 Climate Change and its effect on Stock Market

## Climate Change and Blue Chip Companies



■ will affect Blue Chips ■ will not affect Blue Chips

Diagram-2 Climate Change and its effect on Blue Chips

## **SUGGESTIONS AND CONCLUSIONS**

When compared to other organizations, it is possible to conclude that blue-chip corporations possess a high market capitalization, solid cash flows, consistent dividend payments, stable earnings per share, and a greater number of strengths. Even though there may be some consequences due to weather changes, blue chip firms are generally regarded as secure investments and are recommended for more cautious classes of investors. The study found that domestic investors would be more sensitive than foreign investors to the local weather conditions.

This study, like the others that came before it, indicates that climate change will influence the stock market to a greater extent if certain conditions persist. According to the findings of the study, policymakers should consider the reactions of the market to climate change as well as any abnormalities in the market when formulating policy about both risk and growth expectations. The corporates should strive to make environment-friendly goods and services as well as have long-term strategies to reduce carbon emissions and mitigate the malevolent effects of climate change. In the future, there should be more research undertaken concerning climatic effects and the behavioural attitude of investors as well as the gains of investing in blue chips. These studies would help investors to a greater extent in making the right decision regarding their investments while at the same time, promoting eco-friendly products. The government should intervene in the investment in public transport systems, renewable energy, pollution control measures, waste disposal, and reduction of the use of fossil fuels by introducing solar energy and wind energy appliances.

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**“IMPACT OF EMOTIONAL INTELLIGENCE ON THE JOB  
PERFORMANCE AMONG SCHOOL TEACHERS WITH SPECIAL  
REFERENCE TO ANGAMALY MUNICIPALITY”**

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**ABSTRACT**

The major purpose of the study is to empirically test the association between the factors of Emotional Intelligence (EI) and job performance of school teachers. A study was conducted among 370 teachers presently working in Governmentalized and Unaided schools in Angamaly Municipality. Questionnaire is used to collect data. Further, the findings indicates that EI and job performance is different across teachers' age, working experience at present organization, while their significant difference exhibits across teaching grade and qualification of teachers. Further, the gender shows significant difference only with regard to EI and not with job performance. This study is limited only to examine the relationship between EI factors and job performance of teachers. Further, it would be beneficial to examine other mediating or moderating effect of variable such as self-efficacy, job satisfaction, empowerment, motivation which may have impact on the relationship between emotional intelligence and job performance.

**Keywords: Emotional Intelligence, Job Performance**



## **INTRODUCTION**

Emotional intelligence (otherwise known as emotional quotient or EQ) is the ability to understand, use, and manage your own emotions in positive ways to relieve stress, communicate effectively, empathize with others, overcome challenges and defuse conflict. Emotional management in teachers is extremely important. It prevents stress and helps them deal with complicated situations in the classroom without affecting the students. Teachers can really influence students, so much so that the students can benefit if their teachers change for the better. Therefore, emotional intelligence is very important for teachers. Basic skills to improve emotional intelligence in teachers.

## **REVIEW OF LITERATURE**

Gryn (2010) also carried out the same research of call centre based research in which they concentrated on the leader's ability in the call centre. The consequence of their enquiry was very shocking that among the leaders there was no strong significant association of job quality and EI. They also strongly stated that self-management is the key factor of leadership which could influence leadership and their performance for the organisational growth.

Rahim, Hussain, Saddam (2010) studied the influence of demographic factors such as age, education achievement, length of service, gender, income and marital status on the level of emotional intelligence, which leads to the organizational performance of male and female employees. Female bank employees are emotionally smarter as compare to the male bank employees. The age of male and female employees is negatively correlated with EI. As the level of education improves, so does the level of EI. A good determinant of their performance implies that their employees are pleased and specially satisfied with their job work.

## **PROBLEM STATEMENT**

Emotional Intelligence is playing a vital role in every sector especially in the field of education. It is very much easy to manage 10 machines at a time but it is very much difficult to manage 10 people at a time because they are driven by emotions. We have to deal with these emotions which is very much difficult as well. Compare to other job sectors, in the field of teaching, emotional intelligence playing a vital role. This study is mainly to identify EI on the job performance of teachers, especially high school level teachers.. Teachers are considered as the second parent of every child. They are learning new things from these

teachers. How to with stand the emotions is a major task in these days. The children especially the children belong to the high school classes are very much influenced by their teachers. As the this age category of students are entering into an adolescence stage, the teachers who are interacting with these students should be very much emotional intelligent in order to deal with problems and behaviour of this particular category. The teachers with good emotional intelligence can mould and motivate their students in a right track.

## **OBJECTIVES**

1. To study the impact of Emotional Intelligence on the job performance of school teachers.
2. To find out the factors which influence the Emotional Intelligence of teachers

## **HYPOTHESIS**

- H<sub>0</sub>= There is no significance difference between Conflict Management and Emotional Intelligence
- H<sub>0</sub>= There is no significant difference between Teacher's Performance and Emotional Intelligence
- H<sub>0</sub>= There is no significant difference between Challenges faced and Emotional Intelligence

## **RESEARCH METHODOLOGY**

Research methodology is referred to as the solving of the research problem in a systematic manner by collecting data using various methods and techniques providing an interpretation of the collected data drawing the conclusion about the research data. Essentially a research methodology is an outline of a research or a study

## **RESEARCH DESIGN**

The Research Design is guided by the conceptual structure within which the research take place to conduct the study. This is actually the model for data collection and analysis. Descriptive Research Design is chosen for the study. Descriptive research involves the collection of data which describing the events ,organizing and tabulating, then finally describing and displaying the data .Often visual aids such as illustration charts and diagrams

are used to aid the readers.

## **SOURCES OF DATA**

The data are collected from the primary and secondary sources .

### **PRIMARY DATA**

The primary data is collected through a structured questionnaire from the respondent . The questionnaire consists of various questions on a clear basis focusing on the school teachers. The response which are collected from the teachers are used for analysis. The questionnaire is structured as the heart of the survey operation. The questionnaire was filled in accordance through Interview schedule .

### **SECONDARY DATA**

Secondary data refer to the data that have be then gathered and studied by someone.The secondary data were used for the study, such as journals, projects, articles, books, websites.

## **SAMPLING DESIGN**

### **POPULATION**

All Government, Aided and Unaided Schools in Angamaly Municipality

### **SAMPLE SIZE**

The sample size for the study comprises of about 13 schools which include Government, Aided and Unaided Schools . A sample size of 370 samples is chosen and selected for the study by obtaining the collected data from the respondents from Angamaly Municipality. out of 370 samples, the 64 responses were selected from the Government schools ,111 from Aided schools and 195 from Unaided Schools.

### **SAMPLE TECHNIQUE**

Stratified Sampling technique are used in this study sampling is a method of Sampling from a population that subdivided or sub population . Here, the total population is divided into three groups viz. Government Schools,Aided Schools and Unaided Schools in Angamaly Municipality .

## Data Analysis and Interpretation

H0= There is no significant difference between Conflict Management and Emotional Intelligence

### ANOVA

EI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.671	18	.982	28.866	.000
Within Groups	11.802	347	.034		
Total	29.473	365			

### Interpretation

The table shows the result of Anova Statistics. The significant difference is 0.000 which is lesser than 0.05. It means that the null hypothesis which is set can be rejected and the alternative can be accepted.

### Inference

It shows that there is relationship between Conflict Management and Emotional Intelligence.

H0= There is no relationship between Teaching Performance and Emotional Intelligence

### ANOVA

EI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.050	23	.567	11.816	.02
Within Groups	16.422	342	.048		
Total	29.473	365			

### Interpretation

The table shows the result of Anova Statistics. The significant difference is 0.02 which is lesser than 0.05. It means that the null hypothesis which is set can be rejected and the alternative can be accepted

### Inference

It is clear that there is relationship between Teacher's performance and Emotional Intelligence.

H0= There is no difference between Challenges and Emotional Intelligence

### ANOVA

EI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.459	4	2.865	57.408	.03
Within Groups	18.014	361	.050		
Total	29.473	365			

### Interpretation

The table shows the result of Anova Statistics. The significant difference is 0.02 which is lesser than 0.05. It means that the null hypothesis which is set can be rejected and the alternative can be accepted.

### Inference

It is clear that there is relationship between Challenges and Emotional Intelligence

## **FINDINGS**

- The study states that there is no relationship between age and Emotional Intelligence
- It is clear from the study that there is no relationship between gender and Emotional Intelligence
- The study states that there is no relationship between Experience and Emotional Intelligence
- The study states that designation and Emotional Intelligence are very much related.
- The study states that Monthly Income and Emotional Intelligence are related.

## **SUGGESTIONS**

- Teachers should be emotionally Intelligent to deal with the students as well as the atmosphere they belong to.
- Emotional Intelligence reflects on the performance of the teachers so it is very much necessary to handle with the emotions.

## **CONCLUSION**

Teachers have a significant role in society as they interact with the students to transfer their knowledge to them. For transferring knowledge in a proper way they should be emotionally. Teachers should have effective skills physically as well as mentally which are named as emotional intelligence . Emotional intelligence is really helpful for teacher's performance as it would guide them to communicate clearly, lead others in a proper way which creates productive interaction at work as well as personal life . Present study indicated that when teachers developed emotional competencies and skills which made a complete emotional intelligent behavior and attitude result in the huge success and satisfaction. Experts suggested that teachers having good emotional intelligence would have improved performance.

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